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A

MANUAL OF LOGIC.

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MANUAL OF LOGIC,

DEDUCTIVE AND INDUCTIVE.

BY

H. H. MUNRO.

"Since it is reason which sets in order and finishes all things, it ought not itself to be left in disorder."—STOIC.

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PREFACE.

THE object contemplated in the following pages is to present the tyro with a succinct, yet comprehensive, view of Logic in the simplest possible form.

Instruction in Logic is now no longer confined to Colleges and Universities: it has been introduced into many of our schools and academies; and it is hoped that an effort to simplify, without compromising, the distinctive characteristics of a study, so elegant in its nature, and so highly calculated to train the youthful mind to correct habits of thought, may not be unacceptable to the latter class of seminaries.

The writer has been induced to this undertaking, from its having appeared to him, when employed as a tutor in Logic, that an elementary manual, more simple in its phraseology, and more copious in illustrations and examples, than any of the treatises now in use, might tend, in some measure, to facilitate an earlier and easier acquaintance with the science than is at present attainable.

In the hope of securing this object, the use of abstract symbols in illustration has been almost entirely dis-

carded; for although convenient for the compiler of a logical treatise, and intelligible to the advanced student, they are invariably uninteresting, if not repulsive, to the beginner.

Simplicity has been invariably adhered to, in selecting examples, alike in propositions and syllogisms; but it is hoped that they are not of such a nature as to incur the charge of triviality, so frequently brought against works on Logic, owing to the meagreness of the illustrations usually employed.

The conflicting views entertained, regarding the true province of Logic, surround the publication of an elementary treatise with peculiar difficulties. Any person, however, who has duly considered the matter, can have little difficulty in deciding, that if Logic is to be considered a distinct and self-sufficient scientific art, the formal view must be adopted; for this is the only aspect under which its proper function can be adequately defined and defended. It is possible, however, that the disciples of the formal school, in their abhorrence of the material and verbal views, have somewhat overstrained their own theory; and that, in order to arrive at a yet more satisfactory definition, they must either agree to a slight compromise, or reject, as extralogical, many matters admitted at present into logical works.

In declaring his adhesion to the formal view of the province of Logic, the writer readily admits that he has introduced into the following pages much that is extra-

logical; and his apology is, that his object was not to vindicate any particular theory, but rather to lay before the tyro whatever seemed most useful as an introduction to the subject, more particularly as it has not as yet been determined to what special branch of knowledge matters now deemed extralogical are to be assigned.

The discussion of vexed questions has been altogether excluded from the text, as their introduction seemed inconsistent with the plainness requisite in an elementary work; but when considered necessary, they have been adverted to in Notes.

To the authors of the many very valuable works on Logic, which have recently emanated from Oxford, the writer gratefully acknowledges his obligations. The treatises alluded to are obviously intended to supply the defects and correct the errors of the University Text-book, with such additions as have seemed necessary to prepare students for the present high standard of logical examinations. But although extremely valuable in this respect, the works referred to have left the necessity of a work purely introductory unsupplied.

The writer also willingly acknowledges the benefits he has derived from the unrivalled article by Sir W. Hamilton in the 'Edinburgh Review,' as may be seen from the ample use made of its contents throughout this Manual. To this article the more correct views of the province of Logic, recently adopted in this country, are mainly attributable.

It was originally intended to treat of Inductive Logic at some length in this Manual; but the unexpected space which Deductive Logic has occupied, has rendered a full consideration of it incompatible with the publishing arrangements of the present edition.

GLASGOW, *January*, 1850.

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INTRODUCTION.

THE conflicting opinions entertained by writers on Logic, as to its proper province, and also as to whether it is an art or science, or both, verifies the adage—*Omnis definitio periculosa est.* Aristotle has unfortunately left us no definition of Logic; and from the mixed nature of the contents of the Organon, it would certainly have been difficult to do so.

That Logic is both a science and an art has always been admitted by every one acquainted with its proper province and nature. It is a *science*, inasmuch as by analysing the elements, principles, and structure of arguments, it teaches us how to discover their truths, or detect their fallacies, and point out the sources of such errors. It is an *art*, inasmuch as it teaches us to arrange arguments in such a manner as that their truth may be most readily perceived, or their falsehood detected.

It would be out of place here to enter on an examination of many definitions, as it would be an unprofitable encroachment on space that may be more usefully occupied. It is only intended, therefore, to consider briefly those of Dr Reid, Archbishop Whateley, and Sir William Hamilton.

According to Reid, the professed end of Logic is '*to teach men to think, judge, and reason, with precision and accuracy.*' This definition is evidently founded on the usual division of the cognitive faculties, and, on this account, must be considered at least ingenious. 'To think' is obviously intended to refer to simple apprehension—'judge,' to judgment, mental or verbal—and 'reason,' to syllogism. But this distribution of the cognitive faculties is itself a cross-division, for the dividing members are not distinct. They run into one another, and consequently the same fault characterises the definition founded on them. Logic is certainly furnished with its own peculiar rules and canons; but rules, in any science, can never be employed for the discovery or investigation of truth. Their sole use and end is to guard against error. If this definition were to be admitted, all known sciences might be at once stripped of their distinctive appellations, and be indiscriminately classed under the name—Logic. The grand error in this definition is, however, that it confounds the *material* with the *logical;* in other words, the process of investigation with the inference necessitated by the laws of thought. Logic has nothing to do with things as they exist *really* and in themselves, but only the forms of thought under which the mind conceives them. It is conversant solely about *second,* not *first* notions. Hence, a logical inference is not determined by any *objective* casualty subsisting between the terms of the premisses and conclusion, but solely the *subjective* relation of reason and consequence under which they are construed to the mind in thought. The question whether the premisses of an argument in any objective science are true, is, no doubt, a very important one; but the logician, as such, cannot be called upon to answer it. He may be able to

answer it, but it will be as an Astronomer, Chemist, Geologist, Botanist, &c., as the case may be, but not as a logician; for as a logician he is merely responsible for the soundness of the consequent on the assumed truth of the antecedent. The merit of the correct antecedent is *material* of the correct consequent *logical. Cuique in sua arte credendum.*

In Archbishop Whateley's opinion, '*Logic is the art of employing language properly for the purpose of reasoning.*' This definition restricts the province of Logic to the regulation of language. It may be a slight improvement on the definition of Hobbes, viz., that Logic is '*the art of computation*'—a kind of mental arithmetic, not conducted by figures, but by words. We add, for instance, two terms to make an affirmation, two affirmations to make a syllogism, and many syllogisms to make a demonstration. There is undoubtedly an intimate connection between thought and language; but the regulation of language falls within the province of grammar, not of Logic; for if it were, thought would necessarily be considered a function of a language, instead of language being a function of thought. On this definition, the pointed remarks of Mr Chretien are conclusive: 'If thought be only a function of language, man is better characterised as a speaking than as a reasoning being; for it is more natural and more scientific to define by the cause than the effect. And then, to draw any such inference from man's possessing reason, as that his actions are therefore probably free, or his thinking nature immortal, becomes at once absurd; for none will assert such liberty or immortality to be a consequence of speech, of which reason itself is on this theory a consequence.'[a]

[a] Essay on Logical Method, by Charles P. Chretien, M.A., Oxford.

Sir William Hamilton defines Logic to be '*the science of the laws of thought as thought*—that is, of the necessary conditions to which thought, considered in itself, is subject. This is technically called its *form*.' This definition is probably intended as an improvement on that given by Kant, viz., '*the science of the necessary laws of the understanding and the reason*.' The definition of Kant may be simplified by the explanation, that the inferences of opposition and conversion are considered by him as syllogisms of the understanding, and the usual form of syllogisms as the syllogisms of the reason. Sir William Hamilton's definition is here adopted.

In connection with this definition, the foregoing brief introductory remarks may be very appropriately closed with the following judicious passage from Mr Mansel:—'It is not intended to deny the usefulness of Logic; but it may safely be asserted, that its more valuable fruits are to be found in the training which the mind unconsciously receives, than in the conscious employment of knowledge in the formation and examination of reasonings, and that both, in respect of the true character of the science, are secondary and accidental results—not primary and essential features.'

MANUAL OF LOGIC.

CHAPTER I.

SECTION I.

The ancient Logic consisted of three heads, viz., Simple Apprehension,[a] Judgment, and Reasoning. The earlier Logicians considered these, in so far as the province of Logic was concerned, as the only operations of the mind. From its convenience, this distribution of the cognitive faculties has still been followed.

Under the first head, viz., *Simple Apprehension*, notions are treated of, and these notions, when expressed in words, are called *simple terms*.

The second head, viz., *Judgment*, treated of the agreement or disagreement of any two notions, whether *incomplex* or *complex*, when compared together in the mind; and this comparison is termed a *judgment*, (αποφανσις) and when verbally expressed, a *proposition* (προτασις).

The third head, viz., *Reasoning*, treated of syllogism, or the manner in which, from two judgments or propositions related

[a] There is no phrase in Aristotle exactly corresponding to simple apprehension: the nearest is ἡ των αδιαιρετων νοησις—the apprehension of uncompounded notions; νοησις is, however, not restricted to any specific meaning by Aristotle.

to each other, the mind proceeds to a third judgment or proposition, founded upon and resulting from them.

This division[a] of the mental powers, although objectionable, is at all events recommended by its simplicity. Its *rationale* is as follows:—

1. We first acquire simple notions; from these we proceed to notions of a more complex character, and to the mental faculty by which these two classes of notions are acquired we give the name, *Simple Apprehension.*

2. In virtue of our mental constitution, when once possessed of notions, we begin to compare them; in other words, we institute mental judgments[b] as to whether the notions or ideas we have acquired by simple apprehension, agree or disagree with each other; and the judgments thus formed, when expressed in words, we term *propositions.*

A proposition consists of a *subject*, *predicate* and *copula.* The *subject* is that of which something is *affirmed* or *denied;* the *predicate* that which is *affirmed* or *denied* of the subject; and the *copula* that which *unites* the subject and predicate; as

Knowledge *is* power;—

or disjoins the subject and predicate; as,

Predacious animals *are—not* ruminant.

[a] On this division Sir W. Hamilton remarks:—'The division in question, I make bold to say, never was proposed by any philosopher, as a *psychological* distribution of the cognitive faculties *in general;* on the contrary, it is only a *logical* distribution of that section of the cognitive faculties which we denominate *discursive*, as those alone which are proximately concerned in the process of reasoning or thought, in its strictest signification.'—*Reid's Works*, p. 242.

[b] Reid defines judgment to be *an act of the mind whereby one thing is affirmed or denied of another.* On this definition Mansell remarks very properly, (Rudimenta, p. 3): '*Thing* is vague enough; but it is not easy to comprehend the various kinds of judgment under any more precise expression. The terms of a judgment are not always objects of perception, and the very notions of agreement and disagreement are the consequences of judgment, not the conditions of possibility. In fact, judgment is as necessary to apprehension as apprehension to judgment.'

The substantive verb, in the present tense, is the *affirmative* copula. With the negative particle *not* affixed, it constitutes the negative copula. The affirmative judgment is sometimes called *composition* (συνθεσις), because it unites the two conceptions compared. The negative is sometimes called *division* (διαιρεσις), because, on the other hand, it separates the two conceptions compared.

When comparing ideas, we find agreements to be either *total* or *partial*, and also disagreements to be either total or partial. Hence an affirmative proposition[a] may be either *universal*[b] or *particular*,[c] and a negative proposition[d] also universal or particular.

3. In a syllogism we alternately compare two terms (the *major* and *minor*) with a third, called the *middle* term; and in this way we ascertain whether the two terms, alternately compared with it, agree or disagree with each other.

A regular syllogism consists of three propositions: the two first are called the *premisses*, and the last the *conclusion*. In the premisses, the two terms whose agreement or disagreement is sought to be proved, are compared with the middle term, and the new proposition resulting from them is called the conclusion, e. g.—

Every effect is the result of an adequate cause.
The world is an effect; therefore,
The world is the result of an adequate cause.

No ruminant animals are predacious.
The lion is predacious; therefore,
The lion is not a ruminant animal.

This division of the cognitive faculties into three distinct parts does not imply that they are altogether independent of each other. A progressive connection exists between them;

[a] καταφασις—*oratio affirmans.* [b] καθολου.
[c] κατα μερος. [d] ἀποφασις—*oratio negans.*

and in the view of the logician, apprehension must be considered in its reference to judgment, and judgment in its relation to discourse.[a]

All sciences have their technicalities, and without them no science would be intelligible. Apprehension, judgment, and reasoning, are the names by which logicians have agreed to express the faculties of obtaining evidence, whether intuitive or deductive; and they stand to each other in the relation of *simple*, *complex*, *decomplex*.[b]

It will be seen from the foregoing—

1. That a notion obtained by simple apprehension, when expressed in words, is called a *term*.

2. That an act of judgment is expressed by a *proposition*; and,

3. That an act of reasoning, when stated in regular form, is termed a syllogism.

These three heads will be more fully illustrated in their proper places.

[a] The relation subsisting between the three acts of thought is expressed in both these nomenclatures; the one (simple, complex, decomplex) implying the synthetical advance from apprehension to judgment and discourse; the other (syllogism, proposition, term) resolving, analytically, the complete and final act into its component judgments and apprehensions.—*Woolley*, p. 19.

[b] In speaking of this division, Reid states (Inquiry, cap. 7):—'The second includes the first, and the third includes both the first and second, but the first may be exercised without either of the other two.' On this opinion Sir W. Hamilton remarks: 'Apprehension is as impossible without judgment as judgment is impossible without apprehension. The apprehension of a thing or notion is only realised in the mental affirmation, that the *concept* ideally exists; and this affirmation is a judgment. In fact, all consciousness supposes a judgment, as all consciousness supposes a discrimination.'—*Reid's Works*, p. 242. To the same effect is the following passage from Aquinas (in Perihem, lect. 1): 'Harum autem operationum prima ordinatur ad secundam; quia non potest esse compositio et divisio nisi simplicium apprehensorum. Secunda vero ordinatur ad tertiam: quia videlicet oportet quod ex aliquo vero cognito, cui intellectus assentiat, procedatur ad certitudinem accipiendam de aliquibus ignotis.'

SECTION II.

SIMPLE APPREHENSION.[a]

Simple apprehension is defined to be the mere intellectual conception of a thing.[b] It is of two kinds, viz., *incomplex* and *complex*. Incomplex apprehension is prior in point of time.

INCOMPLEX APPREHENSION.

Incomplex apprehension properly implies simple uncompounded notions; but, for the purposes of the logician, it is sufficient to consider all apprehensions incomplex which are verbally expressed by one word, whether that word represents a simple or compound notion.[c]

Simple notions or intuitions are obtained *immediately* by the mind, and they cannot be analysed into any elements

[a] It may be remarked, that the term simple apprehension is often indiscriminately used to denote either *the faculty* of simple apprehension, or an *act* of this supposed faculty; in other words, the mental power, or the notion acquired by it. It may be observed also, that the words *perception* and *conception* are also frequently used to denote either the act or the object. This ambiguity, against which the English language does not provide, is completely obviated by the Latin. A *perception* (perceptio) denotes the mere act of perceiving; a *percept* (perceptum) denotes the result of the act. In like manner, a *conception* (conceptio) signifies the mere act of conceiving, while a *concept* (conceptum) signifies the thing conceived.

Mr Mansell is of opinion, that simple apprehension is synonymous with conception, in the proper sense of the term. This is true with regard to *mediate*, but not immediate, notions.

[b] Nudus rei conceptus intellectivus.—*Aldrich.*

Operatio qua mens recipit notiones. Notio est representamen rei in intellectu.—*Murray's Comp.*, Part I.

[c] Any *one* word (whether representative of a simple or a compound idea) denotes an *incomplex* simple apprehension in its *logical* sense. So also any number of words, when combined so as to form a sentence, become representative of *complex* apprehension.—*Huyshe*, p. 2.

Incomplex apprehension is of one object, or of several without any order or reference; as, *a king*, *a throne*. Complex apprehension is of several objects, with such order or reference; as, *a king upon a throne*.—*Jackson*, p. 2.

more simple than themselves. Compound notions, on the other hand, are obtained *mediately;* that is, they are the results of many previous mental states.[a]

It is by incomplex apprehension, that the mind acquires the notions represented by each word in a sentence, when the words are considered *separately.* The term '*incomplex*' cannot be affirmed of any notion denoted by a *combination* of words that have a grammatical relation to each other, with the exception of such combinations as, 'a street,' 'a palace,' &c.

COMPLEX APPREHENSION.

Any combination of words grammatically related, but not forming a proposition, represents a complex notion; as, 'a member of Parliament,' 'the balance of power,' 'a regiment of soldiers.' In contradistinction to incomplex apprehension, complex apprehension represents the notions implied by all the words of a sentence taken *collectively.* The notions acquired, both by incomplex and complex apprehension, are expressed by *simple terms.*

SIMPLE TERMS.

A simple term is one or more words, expressing the subject of a proposition, or what is affirmed of that subject. The subject of a proposition may be expressed by one or more words; as, *time*, *wisdom*, *a troop of cavalry;* and so also may what is affirmed of any subject; as, *invaluable*, *from on high*, *advancing to battle.* If we join these subjects by a copula, to what is affirmed of them respectively, we shall have two terms in each proposition, and no more, e. g.—

Time is invaluable.
Wisdom is from on high.
A troop of cavalry is advancing to battle.

[a] A perception *immediate* and individual, is an intuition; the same *mediate*, and by means of a mark common to many things, is a conception.—*S. T. Coleridge.*

A proposition, in which the copula and predicate are separated—as, *magna est veritas*—is said to be *tertii adjacentis;* and a proposition, in which the copula and predicate form one word—as, *aves volant*, is said to be *secundi adjacentis.*[a]

A simple term, whatever number of words it may contain, must not be confounded with a *sentence* or *proposition* containing a *judgment.* In a simple term there is nothing affirmed or denied. It is a collection of words grammatically related, but not connected by a copula, and may be either the subject or predicate of a proposition, but not the whole of a proposition, e. g., *Burton's Anatomy of Melancholy*, is a simple term; but *Burton's Anatomy of Melancholy is remarkable for learning and research*, is a proposition.

As the correctness of simple acts of judgment, as well as of prolonged processes of reasoning, depends on the clearness and distinctness of our apprehensions, this head of the ancient logic treats of the logical instruments that direct us in apprehending well, and the chief instruments are definition and division. Our notions themselves may be obscure, or their verbal expression may be indistinct. Hence the error incident to apprehension is *indistinctness.*

Indistinctness in our apprehensions may arise either from the imperfections of our faculties, or from a limited knowledge of the objects of which we form our conceptions. In the former case the indistinctness is unavoidable, e. g., Our conceptions of the *Divine Being*, his *attributes*, *heaven* and *angels*, and of whatever is only communicated to us by revelation, must be obscure. In the latter case the indistinctness is accidental, and may be remedied by study and observation. In all cases, the distinctness or indistinctness of our apprehensions will depend on our acquaintance with the object-matter. For without a definite and accurate knowledge of

[a] This distinction is recognised by Aristotle, but he does not deem it necessary that the latter should be resolved into the former. It was among the Latin commentators that the distinction first acquired prominence.

the meaning of terms, we cannot reason about them with an assurance that they are full and true representatives of the things signified.

The error incident to the faculty of judgment is *falsity*, and arises from asserting the agreement or disagreement of things according to the knowledge we possess regarding them, and not as they are in themselves. Hence such incorrect judgments; as,

The earth is stationary.
The surface of the earth is a plane.
Dews fall from the air.
Moonlight is cold.
The sun rises from the sea upwards.
The eye judges of distance and magnitude intuitively.

Judgment is liable to be misled by the *senses*, *authority*, *example*, and the *passions*.

The error incident to reasoning is a *faulty mode of inferring* (mendosa collectio.)[a] If our previous apprehensions are indistinct, and our judgments regarding them false, new judgments deduced from them cannot fail to be erroneous, e. g., *Honesty is the whole of religion;* therefore, *I may indulge in excess with impunity. Qui sapit pauca loquitur; pauco loquor;* ergo, *sapio.* It frequently happens, on the other hand, that from true premisses a false inference is deduced.[b]

The object of logic is to obviate these defects, by prescribing rules for our guidance alike in investigation and inference.

[a] *Mendosa collectio* is remedied by the rules of syllogism and induction; and here logic not only enables us to perform the operation rightly, but also to test the correctness of any given argumentation.—*Mansell*, p. 6.

[b] The Melitans drew an erroneous conclusion, when they reasoned thus: *This stranger is about to be killed by a venomous serpent;* therefore, *he is a murderer pursued by vengeance.* Nor was their subsequent inference less erroneous, when, in consequence of his shaking off the animal without injury, they said *he was a god.*

TERMS.

A *term* has been defined to be *a vicarious sign of a thing or idea used by conventional agreement.*[a]

A term is the sign of a *thing* when it represents an object known by any particular sound, or combination of sounds. It is the sign of an *idea* when it conveys by being uttered the same idea to the hearer's mind which the speaker had in his own. It is a *vicarious* sign, because it not only conveys the idea of an object, but it also supplies the place of that object.[b]

Whatever sounds, therefore, are not ex instituto, i. e., ratified by conventional agreement or mutual consent, cannot be considered terms—such as groans, shrieks, exclamations, &c., which are suggested by nature.

Terms are divided into three classes—*simple, complex,* and *decomplex.*[c]

[a] Signum rei vel conceptûs ex instituto vicarium.—*Aldrich.* The term 'signum' is somewhat indefinite, for anything may be made a sign, whether vocal or not, by conventional agreement. 'Signum vocale' would remove all ambiguity.

In M. Duval Jouve's Logic, p. 201, language is thus divided,—

Languages are
- Natural
 - Absolute—*Cries* and *Gestures.*
 - Conventional—*Speech.*
- Artificial
 - Absolute—*Painting* and *Sculpture.*
 - Conventional—*Emblems, Telegraphic Signs, Hieroglyphics, Writing.*

[b] Words are merely *arbitrary* signs, and they do not naturally possess any fitness in their sound or form, as necessary in order that they should express the ideas or objects intended. If this were the case, all languages would have the *same* words to express the *same* ideas, which is not the case; for the same sound conveys different ideas in different languages, and not only in *different,* but in the *same* language, as is the case with equivocal words.—*Huyshe,* p. 1.

[c] The old logicians called a term a vox simplex, a proposition a vox complexa, and an argument a vox decomplexa. For by 'vox' they understood not a word, but an expression of thought in language.—*Moberly,* p. 9.

I. OF SIMPLE TERMS.

Simple terms are of three kinds, viz., *Categorematic*, *Syncategorematic*, and *Mixed.*

1. Categorematic Terms are also called simple terms (termini simplices) and are such as may be used alone either as the subject or predicate of a proposition, as *omniscience*, or constituting together with their adjuncts one simple logical term, as, *the Queen of England.* They must express a completed act of apprehension,[a] but no more. In the proposition,

Virtue is its own reward,

the term *virtue* by itself constitutes the subject, and the term *reward*, with the adjuncts, *its own*, constitutes the predicate. There are therefore only two simple terms.

This class of terms consists either of nouns substantive in the nominative case, used by themselves, nouns substantive in the nominative case with adjuncts, or verbs in the infinitive mood—these last being, properly speaking, nouns substantive. Nouns in the oblique cases are not simple or categorematic terms.

But although simple or categorematic terms may be used alone, either as the subject or predicate of a proposition, they may consist of an indefinite number of grammatical words, provided the combination expresses a complete act of apprehension. In the following propositions, the subject, copula and predicate are laid down in regular order; the copulas are printed in *italics*, and the grammatical words which express a simple complex apprehension, either as subject or predicate, are united by hyphens:—

[a] By simple terms, Aristotle means the 'limits or terms (ὅροι) into which a proposition is resolved.' These are the noun as subject, and the verb as predicate, e. g., *avis volat.*

The—ways—of—wisdom *are* ways—of—pleasantness.

Man — that — is — born — of — a—woman *is* of—few—days—and—full—of—trouble.

The —single—consideration—of—the—progress—of—a—finite—spirit—to—perfection *is* a — consideration — sufficient — to—extinguish—all—envy—in—inferior—natures—and—all—contempt—in—superior.

2. Syncategorematic[a] Terms are such as in sense form only a part of a subject, or predicate, inasmuch as they only imply an incomplete act of apprehension, and consequently have not enough of independent meaning for a term. Singly they express not a term, but a part of a term. This class comprises all adjectives, nouns in the oblique cases, verbs, adverbs, &c.;[b] for these by themselves do not express complete acts of apprehension, as they always stand in a relation to some other word, either expressed or understood, e. g., The following words—*single, some, miserable, this, wonderfully, truly, of me, him, John's*—must be joined with some other words, in order to render the act of apprehension complete.

Some writers on logic are of opinion, that adjectives may by *themselves* constitute a predicate; they are, however, merely syncategorems, and can only form a part of a predicate, for they require a substantive either expressed or implied. In the proposition,

Fame is precarious,

the word *precarious* does not constitute the entire predicate, for of itself it is incomplete, and must be supplemented by the adjection of *thing*, either expressed or understood.

[a] The terms categorematic and syncategorematic, are not used by Aristotle. They originated with the Greek commentators. The latter term is compounded of συν, *with*, and κατηγορεω, *to predicate*, because it is only *with* some other words that terms of this description can be predicated.

[b] There is an exception to this when we are speaking of the terms themselves, without relation to any other; as when we state that *large* is an adjective, or that *never* is an English word.

This will appear still more evident by converting a proposition, in which the predicate is expressed by an adjective, e. g. *Some animals are four-footed.* This proposition, when simply converted, becomes, *some four-footed things are animals.* Now, without the introduction of the word *things*, or *beings*, this last proposition would be ungrammatical; and since by conversion is meant the transposition of the *extremes* of a proposition, without any change in the extremes, it is obvious that the word *things*, or *beings*, must have been implied in the predicate of the converted proposition.[a]

3. Mixed Terms are formed by a combination of the other two species. They have been distributed into three classes:—1. A mixed term may be made up of two syncategorematics, as *semper*, i. e., omni tempore, *always.* 2. A mixed term may be made up of a categorematic, and a syncategorematic; as, *nemo*, i. e., nullus homo, *none;* and, 3, a mixed term may be made up of a syncategorematic, and the copula *currit*, i. e., est currens, *is running.*[b]

To this class all grammatical verbs must be referred, as they are all resolvable into the copula and the participle,

[a] An adjective, however, is capable of standing by itself, as the predicate of a proposition; as when we say, snow is white; and occasionally even as the subject, for we may say, white is an agreeable colour. The adjective is often said to be so used by a grammatical ellipsis: snow is white; instead of, snow is a white object; white is an agreeable colour, instead of, a white colour, or the colour of white, is agreeable. The Greeks and Romans were permitted, by the rules of their language, to employ this ellipsis universally in the subject, as well as in the predicate, of a proposition. In English this cannot, generally speaking, be done. We may say, the earth is round; but we cannot say, round is easily moved; we must say, a round object. This distinction is, however, rather grammatical than logical. Since there is no difference of meaning between *round* and a *round object*, it is only custom which prescribes that on any given occasion one shall be used, and not the other.—*Mill's Logic*, vol. i. pp. 29, 30.

[b] The division and examples are those of Aldrich. The division is a cross one; the parts not being opposed; for every mixed word must either be categorematic or syncategorematic.

e. g., I stand, is equivalent to, *I am standing;* or, *I am a person standing.*[a] There is an exception in the case of the substantive verb, in the indicative mood and present tense, when it simply denotes unqualified existence; for of itself it is not a predicate, but may coalesce with a predicate. Its sole use is to connect an attribute with a subject. But where existence only is affirmed, it may be both copula and predicate; as, Deus *est*, God is.[b]

II. COMPLEX TERMS.

A Complex Term consists of three simple words, for it expresses *judgment.* An act of judgment presupposes two complete apprehensions, the decision as to the agreement or disagreement of which is a judgment; and consequently the form of language necessary to express an act of judgment must consist of three simple words, which together constitute one *complex* word. The three simple words may, however, be expressed in one; as, *scribo — I am writing*; *abest—he is absent*; or in two, as, *Ipse adest—He is present.* Hence a complex term may be implied by either *one* or *two* words, if they are respectively resolvable into *three.* But of the three simple words which form a complex term, the two denoting the subject and predicate

[a] 'A mixed term is, in the only useful sense of the word, categorematic. It belongs to the class of what have been called many-worded names.'—*Mill's Logic*, vol. I., p. 30.

[b] The copula *is* means always *exists*, but, when used in a proposition, it expresses an existence modified or limited by the predicate; when employed alone, it expresses *absolute* existence, i. e., that the subject is among the class of really existing things. Upon this variation a well-known fallacy was founded—that of arguing that, because 'Ptolemy *is* dead,' (i. e., only exists to us in the way that a dead person can, by a remembered or traditionary notion;) therefore, 'Ptolemy *is*' (i. e., has an actual living existence among other living persons,) which is a very different statement.—*Outline of the Laws of Thought*, p. 179.

may consist, as has been shown above, of a number of grammatical words, e. g.—

The—doctrine—which—places—the—chief—good—in—the—pleasures—of—the—body *is* unworthy—of—a—philosopher.

The—dialogues—of—Plato *are* often—very—lively—representations—of—conversations—which—might—take—place—at—a—great—university—full—of—rival—professors—and—eager—disciples.[a]

The—origin—and—sufferance—of—evil, *is* a—question which—has—more—than—any—other—harassed—metaphysical—reasoners—but—especially—theologians—and—upon—which—it—is—probable—that—no—very—satisfactory—conclusion—will—ever—be—reached—by—the—human—faculties—in—our—present—state.[b]

As to signification, the subject is always first in a sentence, and the predicate last. They are often, however, reversed in arrangement, e. g.—

Sweet is the breath of morn.

Shoreless is the sea of praise.

In deciding on which is the subject and which the predicate, in such propositions, the meaning of the context must be our guide.

III. DECOMPLEX TERMS.

A Decomplex Term expresses an act of reasoning, and consists of three complex terms or propositions, having a certain relation to each other; for a completed act of reasoning implies two previous judgments, from which a new judgment, asserting agreement or disagreement, is inferred. Hence, when in regular form, it cannot be expressed in fewer than

[a] Mackintosh. [b] Brougham.

three propositions, e. g., In inferring the immortality of the soul from its immateriality, the mental process is as follows:—The mind first assents to the judgment, that *everything immaterial is immortal;* it then assumes, that *the soul is immaterial;* and, lastly, proceeds to a third judgment, viz., that *the soul is immortal.* It is logically represented thus—

Whatever is immaterial is immortal.
The human soul is immaterial; therefore,
The human soul is immortal.

Or in inferring *the sphericity of the earth, from its casting a circular shadow*, the same process is repeated, thus—All bodies which, in whatsoever position they may be, cast a circular shadow, are spherical. The earth is a body which, in whatsoever position it may be, casts a circular shadow; therefore, the earth is spherical. Or in inferring *that an infant is not responsible, from its not being capable* of deliberate crime, thus—

No being incapable of deliberate crime is responsible.
An infant is a being incapable of deliberate crime; therefore,
An infant is not responsible.

OF THE LOGICAL TERM.

The Logical Term is defined by Aldrich: 'Terminus simplex sine tempore significativus'[a]—i. e., *a term which is significant, and has no reference to time.* This definition is obviously inaccurate, for although it excludes *reference to time*, it does not exclude *relation;* and therefore fails in giving the logical term a sufficiently absolute character. By excluding relation to time, the logical term becomes opposed to the verb. The following definition is more accurate: *A logical term is a word which is significant, and inexpressive of relation or time.* This additional limitation excludes all adjectives and nouns in the oblique cases from being logical

[a] φωνη σημαντικη κατα συνθηκην ανευ χρονου.—*Aristotle.*

subjects or predicates. By this definition, a logical term is equivalent to a *simple term*, or *categorem*, and consequently excludes adjectives, nouns in the oblique cases, verbs, &c., except as forming *a part* of a subject or predicate; for as these have no complete and independent signification of their own, they can merely serve to qualify or denote the relation between the words with which they are joined. By Aristotle the oblique cases of the noun were named πτωσεις ονοματος, i. e., fallings or flexions of the noun, and the past or future tenses of the verb were termed πτωσεις ρηματος.

A logical term must not be confounded with a grammatical term or phrase. It is employed to express distinctly an idea, simple or complex, particular or universal.

The word or words employed to express a subject or predicate, constitute a logical term; as,

Wisdom *is* valuable.

A clock *is* a mechanical contrivance, to show the progress of time.

Criminal indulgences *are* benumbing to the moral feelings.

Unsought advice *is* the dictate of presumption.

All the metals *are* fusible by heat.

Logical terms are divided into *singular* and *common*.

A Singular Term expresses the notion formed of an individual object and its qualities. Hence it is called in logic an *individual* noun (*individuum*[a]), borrowing that distinctive epithet from the nature of the notion it represents—namely, an individual notion, or the apprehension of an individual object. Such a notion cannot be divided either by classification or enumeration, for its object is *numerically one*. Anything that has actual existence is *singular*, i. e., numeri-

[a] The accurate etymological sense of the word individuum is plainly that which has no qualities which we know of—*quod nihil habet dividui*—but is an object of sensation (perception) known to us only by its occupying a certain space at a given time.—*Moberly*, p. 11.

cally one, and is therefore capable of being expressed by a singular sign or term; as, *a sofa*, *a coach*, *a tree*, &c.

So long as our knowledge is very contracted, this may be done; but as knowledge becomes increased, it would be burdensome to appropriate a distinct name to each individual object.

But when we merely consider the general nature and character of an object expressed by a singular term, i. e., its being of such a description as may equally apply to other single objects, the inadequate or incomplete view thus taken of it is expressed by a *common* term, e. g., When we use the term *bridge*, we do not refer to any particular individual bridge; but when we say *this bridge*, we refer to some existing bridge, distinguished by accidents or peculiarities from all other bridges. It is evident, therefore, that singular terms, which denote any one individual object, cannot be *affirmatively* predicated of anything but themselves; in other words, they cannot be the predicate of any affirmative proposition, unless its subject be a term expressive of that same individual object which the singular term represents, e. g., *This river*, and the *Danube*, are singular terms, which cannot be predicated of anything but themselves; for we may say, *This river is the Danube*, but we cannot predicate of any other river that it is the Danube. Singular terms may be used, however, as the predicate of any negative proposition, whose subject does not express the same individual object, e. g., *Ætna is not Mount Blanc.*

All proper names are singular terms; as, *England*, *the Thames*, *Aristotle*, *&c.*

Singular terms are sometimes employed (not logically, but figuratively) as *common* nouns; as,

The *Cicero* of his day.

The grand *Napoleon* of the realms of rhyme.

A Common Term is a name which is capable of being affirmed truly in the same sense of each of an indefinite num-

ber of individuals. It does not represent anything that has actual existence, but an idea or nature *common* to many individuals; and this common notion is formed by classing various objects together that have common points of resemblance. Common terms denote a whole class. A class is the indefinite multitude of individuals denoted by a common name; as, *bird*, *flower*, *conqueror*, *river*, and any individual in that class, and, consequently, may be affirmatively predicated of *all* or *any one* of these individuals, e. g., An eagle is an individual included in the common term, 'bird.' Hence we can say, *An eagle* is a *bird;* and in the same way, we can say that *a daisy* is a *flower*, and that the *Tweed* is a *river*. A common or general name must be distinguished from a *collective* name. A general name is one which can be predicated of *each* individual of a multitude; a collective name cannot be predicated of each separately, but only of all taken together.

Common terms are called *predicables*, from their capability of being affirmatively predicated of several things, viz., the individuals they denote.

It ought to be remembered, that a common term does not give us an adequate notion of an individual, because in forming a class (of which a common term is merely the sign or expression) we attend to points of resemblance, but exclude points of difference. And it is the inadequacy occasioned by this exclusion of points of difference or accidents, that renders it equally applicable to any of the individuals possessing the property or properties which have been abstracted, and which are designated by that common term. If, for instance, we exclude from consideration all the peculiarities which distinguish 'Sicily' from any other island, and merely attend to the circumstance of its being surrounded with water, we form a notion expressed by the common term *island;* but this notion does not adequately distinguish Sicily, for it does not imply any of its peculiarities, and is therefore equally appli-

cable to any one of an indefinite number of islands, or in the plural to several together.[a]

A DEFINITE TERM is one to which the negative particle is *not* prefixed.

An INDEFINITE TERM[b] is one to which the negative particle *is* prefixed; as, *that man is not a Swede.* The negative particle is termed *indefinitant*, because when prefixed to a noun it renders that noun indefinite. In the proposition, *That man is not a Swede*, the term *Swede* is used indefinitely; for when it is asserted of that certain man that he is not a *Swede*, the class Swede alone is excluded, and to what other class of men he may belong remains wholly undefined.

The *definite* and *indefinite* terms together constitute a perfect division or *dichotomy.* Thus all animals are either *rational* or *not rational;* all created things are either *sentient* or *not sentient*, *corporeal* or *incorporeal.* All men are either *virtuous* or *not virtuous.*

A POSITIVE TERM speaks of a thing as being present, i. e., *possessed* by a subject; as, a *rational* man; a *living* man; *pleasant* society; a man *of feeling;* a *mortal* body; a *fruitful* vine; a man *of wit;* a man *of merit.*[c]

A PRIVATIVE TERM denotes the absence of a thing from a subject *capable* of possessing it; as, an *uneducated* man; *unpleasant* sounds; *immortal* fame; an *unfeeling* wretch; a

[a] See Abstraction and Generalisation.

[b] Nomen infinitum—*Aldrich.* More properly, *nomen indefinitum*—ονομα αοριστον. This mistranslation of Bóéthius has been the cause of error, among others, to Kant.—*Sir W. Hamilton Reid's Works*, p. 685.

[c] Names which are positive in form are often negative in quality, and others are really positive, though their form is negative. The word *inconvenient*, for example, does not express the mere absence of convenience; it expresses a positive attribute—that of being the cause of discomfort or annoyance. So the word *unpleasant*, notwithstanding its negative form, does not connote the mere absence of pleasantness, but a less degree of what is signified by the word *painful*, which it is hardly necessary to say is positive.—*Mill's Logic*, vol. i. p. 52.

fruitless search; an *unconstitutional* declaration; the *demerit* of our works.

A NEGATIVE TERM denotes the absence of a thing from a subject *incapable* of possessing it; as, a *lifeless* corpse; *unpleasant* sarcasms; the *senseless* rock; the *unfruitful* elm; the *demerit* of sin.

An UNIVOCAL TERM has one signification only, and in that one signification it is *equally* applied to many things. Thus *man, genus, electricity*, are univocal terms for they always signify the same thing.

An EQUIVOCAL TERM has *more than one signification*, and in each of its different meanings is a distinct common term—the coincidence in sound or sense, or both, being purely accidental. That some words should be used in different senses, is unavoidable, owing to the scantiness of language, e. g.,[a] *Club:* a stick; a society. *Mail:* a post-bag; armour. *Tract:* a small book; an extent of country. *Ounce:* a species of animal; a legal weight. *Palm:* a species of tree; the interior of the hand. *Page:* an attendant; side of a leaf in a book. *Bull:* the animal; the Pope's official letter; a blunder.

ANALOGOUS TERMS are such as have one meaning, with various applications and modifications. In this class of terms a few only of the leading ideas are retained, while the terms themselves are appropriated in a modified and subordinate sense to objects which bear no more than an analogy or similarity to their original application.

A word the same in form and sound, if it be predicated of several subjects in the same sense, i. e., to express the same collection of qualities, is *univocal;* if in different senses, i. e.,

[a] In reality, an equivocal or ambiguous word is not one name, but two names accidentally coinciding in sound. *File* standing for an iron instrument, and *file* standing for a line of soldiers, have no more title to be considered one word, because written alike, than *grease* and *Greece* have, because they are pronounced alike. They are one sound, appropriated to form two different words. —*Mill's Logic*, vol. i. p. 57.

to express different collections of qualities, and these *connected*, is *analogous;* if unconnected, *equivocal*, e. g., Man is predicated of John and Thomas, univocally; of Thomas and his picture, analogously; of an island and Thomas, equivocally.

The following are examples of analogous terms:—

Sting: of an animal; of conscience; of an epigram.

Judgment: a legal decision; a faculty and an act of the mind.

Fall: the act of dropping; moral degradation; the autumn; diminution in price; musical cadence.

A *vein* of the body; of metal; of poetic feeling.

Heat; caloric; the sensation produced by caloric.

Intention: the state of being strained; purpose; close attention; application of a word.

Justice: social right; punishment; the administrator of social right or legal punishment.

Sacramentum: a military oath; a christian sacrament.

In these examples, the resemblance in signification is in some cases more, and in others less distinct, though in every instance some analogy may be traced.

A Concrete Term is the name of an *object*, and represents a quality in connection with a subject; in other words, it expresses the quality, and at the same time implies the subject in which that quality exists; as, *brave*, *wise*. The words *brave*, *wise*, cannot be used without at the same time implying or referring to the beings possessed of the qualities, *bravery*, *wisdom;* but *bravery* and *wisdom* are abstract ideas, and might be used without any reference whatever to the subjects, *brave*, *wise*. Concrete nouns consist of adjectives, and words which, though *substantively* used, are equivalent to adjectives; such as, *fool*, *philosopher*, *astronomer*, *geometrician*, &c. These are all concretes, of which the abstracts are *folly*, *philosophy*, *astronomy*, *geometry*, &c.

An Abstract Term is the name of an *attribute*, and expresses a quality by itself, without any reference to the subject in which it exists; as, *wickedness*, *selfishness*.[a]

An Absolute or Non-Relative Term, as opposed to a relative term, denotes a word whose meaning is complete in itself, and does not imply a relation to any other thing.

Absolute terms are also named *non-connotative*, as merely denoting an object, without implying any attribute of that object; as, *Paris*, *Romulus*.

A Relative Term expresses an object as related to some other, or an idea which cannot be apprehended without having at the same time a notion of its correlative. Thus, *father* implies the notion of *son*, and *son* of *father*; such are also *king* and *subject*, *cause* and *effect*, *whole*, *half*, *double*, *treble*, *great*, *small*, *swift*, *slow*, *high*, *low*.

Every relative term has its correlative. The correlative is that which the relative term suggests. Thus the word *children* calls up the correlative *parents*. In this case children is the relative, and parents the correlative, term. The word *parents*, again, suggests *children*, in which case the word parents is the relative, and children the correlative. In short, the same term may be either a relative or a correlative, according as it suggests or is suggested.

Agreeing Terms are such as express qualities which can

[a] Do abstract names belong to the class of general, or to that of singular names? Some of them are certainly general; I mean those which are names not of one single and definite attribute, but of a class of attributes. Such is the word *colour*, which is a name common to whiteness, redness, &c. Such is the word magnitude, in respect of the various degrees of magnitude and the various dimensions of space; the word *weight*, in respect of the various degrees of weight. Such also is the word *attribute* itself, the common name of all particular attributes. ut when only one attribute, neither variable in degree nor in kind, is designated by the name; as, visibleness, tangibleness, equality, &c., then the name can hardly be considered general; for though it denotes an attribute of many different objects, the attribute itself is always conceived as one, not many.—*Mill's Logic*, vol. i. pp. 35, 36.

be affirmed of any one object *at the same time;* as, a theory may be *popular* and *dangerous;* an edifice may be *massy* and *elegant*. Agreeing terms are sometimes called *compatible* or *consistent* terms.

Opposite Terms express qualities which cannot be affirmed of any one object *at the same time*, e. g., A style cannot be said to be *eloquent* and *bald* at the same time; neither can we say that a report can be at once *true* and *false*, nor a man *miserable* and *happy*. At *different* times, however, *opposite* terms may be predicated of the same object. Thus, a man may be said to be *active* to-day, and *inactive* to-morrow.

Terms of Primary and Secondary Intention.[a]

A *first* or *primary intention* is properly defined a conception of a thing or things formed by the mind from materials existing without itself; as, *man*, *animal*, *tree*. A *second intention* is a conception of another conception or conceptions, formed by the mind from materials existing in itself; as, *genus*, *species*, *accident*, &c.

'Notions are of two kinds; they have either regard to *things as they are*—as, *horse*, *ship*, *tree*, and are called first notions—or to things as they are *understood*, as notions of *genus*, *species*, *attribute*, *subject*, and in this respect are called second notions, which, however, are based upon the first, and cannot be conceived without them. Now logic is not so much employed upon first notions of things as upon second; that is, it is not so much occupied with things as they exist in nature, but with the way in which the mind conceives them. A logician has nothing to do with ascertaining whether a horse or a ship or a tree exists, but whether one of these things can be regarded as a genus or species, whether it can be called a subject or an attribute, whether from the conjunction of many second notions a proposition, a definition, or

[a] This distinction is of Arabian origin.

a syllogism can be formed. The first intention of every word is its real meaning; the second intention its logical value, according to the function of thought to which it belongs.' [a]

Connotative Terms. All concrete common terms are connotative. They denote a subject, and imply an attribute. The common term *man*, for example, denotes Cicero, Quintilian, Juvenal, &c., and any other number of individuals, because it is the name of the class to which, as a class, they belong; and it is applied to them not only in virtue of their possessing, but as denoting that they do possess certain marks or attributes.

There is another class of terms, which, although *individual* terms, are called connotative: e. g., 'the author of the Iliad' connotes (i. e., notes along with it) 'Homer;' 'the founder of Rome' connotes 'Romulus;' 'the capital of France' connotes 'Paris.' [b]

[a] Outline of the Laws of Thought; pp. 39, 40.

A *first notion* is the conception of a thing as it exists of itself; as, John, man, animal. A *second notion* is the conception not of an object, as it is in reality, but of the mode under which it is conceived by the mind itself; as, individual, species, genus. The former is the conception of a thing—real, immediate, direct; the latter the conception of a conception—formal, mediate, reflex.—*Sir W. Hamilton, Ed. Rev.* vol. lvii. p. 210.

Whately and a host of others define the *first intention* of a term to be a certain vague and general signification, and the second intention to be the more *precise* and *limited*, which it bears in some particular art, science, or system. This misconception, which is to some extent countenanced by Aldrich, has arisen from confounding the words *intention* and *meaning*. Intentio—ἐντασις—in this application properly signifies a stretching of the mind to a thing. The examples usually given are of analogous terms, not of terms of the first and second intention.

[b] In treating of terms, no particular method has here been followed. The proper division is into *singular* and *common*, as it is exhaustive of the whole class. With the exception of the terms distinctively designated singular, all the terms above explained are really common terms employed in different ways, and named accordingly.

CHAPTER II.

SECTION I.

ABSTRACTION AND GENERALISATION.

A CORRECT understanding of the processes indicated by these terms respectively, will be of advantage in studying the doctrine of the predicables.

1. *Abstraction.*—Abstraction literally signifies *a drawing off, or taking away from;* but in its strict and secondary sense it means the separate consideration of one or more of the parts or qualities of any species of whole, omitting or excluding for the moment all consideration of the other co-existing qualities. This process invariably precedes generalisation. The parts or qualities excluded at one time may again be made the objects of new abstractions, and become the groundwork of new classes denoted by common names.

When, therefore, we draw off and consider separately any part or quality of an object[a] presented to us, we are said to *abstract;* and with this simple act the province of abstraction terminates.

We may, for example, attend to the *fragrance* of a violet,

[a] There is a prevalent confusion regarding the meaning of the words *subject* and *object.* 'Not to understand these words,' remarks the author of the 'Outline of the Laws of Thought,' note, p. 52, 'is a disqualification for the study of modern philosophy. The *subject* is the person who receives impressions; the *object* is the external thing which gives them. When I see a mountain, I am the subject, and the mountain the object. *Subjective*, therefore, would mean "relating to the mind that thinks;" *objective* "relating to the thing thought of." This use of the words, though now universally followed, is of modern origin; formerly that in which any qualities inhered was called the "subject" of them, a very different use of the word.'—[For a masterly disquisition on this point, see *Tappan's Elements of Logic*, sect. iv.]

and for the moment exclude all consideration of its *form* and *colour*, or we may contemplate its form and colour, disregarding its *fragrance;* and in either case, after this individual violet (which may have been the first we have ever seen) is withdrawn from our consideration, we still retain a notion of its fragrance, or notions of its form and colour; and the notions thus retained are properly termed *conceptions.*

Again, a person may have for the first time seen *a sheep*, and may have attended to, or abstracted the circumstance of its having four legs, excluding from consideration all the other co-existing marks; and the conception remaining in the mind, after this individual was no longer present, would be that of a *four-footed animal.* If he had heard the name *sheep* applied while contemplating it, this name, when uttered again in his hearing, would also suggest the conception of a four-footed animal, and, in the circumstances, this would be properly termed a reproduced notion.

By abstraction, then, the mind fastens upon a particular quality or mark, and separates it from the co-existing aggregate of qualities. Hence when abstracting, we think of the properties or marks, and not of the object to which they belong.

Instances might be multiplied indefinitely, but those given above will suffice to show the exact nature of what is termed abstraction, and that it should not be confounded, as it too frequently is, in logical treatises, with its co-process generalisation.

2. *Generalisation.*—We have seen that, in *abstracting*, the mind attends to the consideration of any one or more of the qualities or parts of any species of real or ideal whole, disregarding for the moment all the remaining co-existing parts or qualities, and that beyond this its province does not extend. It is manifest, however, that if we could not classify the abstracted attributes or marks according to some relation subsisting between them, our knowledge would be of little

practical advantage. But the difficulty of making our knowledge available is obviated by a natural tendency in the mind to proceed from abstraction to generalisation; in other words, to assemble together and classify all such qualities or parts of wholes as possess common points of resemblance or agreement; and when any two or more of these are classed together, we are said to generalise, and we express the generalised property or mark by a *common* or *general* term.[a] It is not to be supposed, however, that what is implied by a common term has any actual existence. We conceive it to exist, merely for the purposes of classification and generalisation.

Common or general terms are always employed as signs of general notions, and are obtained by comparing several individual objects with each other; and after noting the marks or points in which they agree, as well as several in which they differ, we lay aside the consideration of the latter, and adopt and class all and only those points in which the individual objects appear to agree with each other. A common term is

[a] We cannot generalise without having first abstracted; but whether there may be abstraction without generalisation is a question not quite agreed upon. In the 'Lessons on Reasoning,' (usually attributed to Archbishop Whateley) the following passage occurs:—'The two words have not the same meaning; for though we cannot "generalise" without "abstracting," we may perform abstraction without generalisation. If, for instance, one is thinking of "*the sun*," without having any notion that there is more than *one* such body in the universe, he may consider it without any reference to its *place* in the sky, whether rising or setting, or in any other situation (though it must be always actually to *some* situation); or, again, he may be considering its *heat* alone, without thinking of its *light*, or of its light alone, or of its apparent *magnitude*, without any reference to its light or heat. Now in each of these cases there would be *abstraction*, though there would be no *generalisation*, as long as he would be contemplating only a single individual—that which we call the "sun." But if he came to the belief that each of the *fixed stars* is a body affording light and heat of itself, as our sun does, he might then, by *abstracting* this *common* circumstance, apply to all and each of these (the sun of our system, and the stars) one common term denoting that circumstance—calling them all "suns." And this would be to *generalise*.'

consequently only applicable to the several objects in respect of that which is common to them all, and therefore makes no account of the differences between them. In this way we obtain a term denoting the individuals *themselves*, in respect of their points of resemblance, and this we designate a *concrete* common term; or we obtain a term implying the *points* or *circumstances* in which the various individuals agree, which we call an *abstract* common term, e. g., From noting the various points of agreement in various individual *kings*, we obtain the common term *king*, while the term *royalty*, which is an abstract common term, denotes the qualities or properties common to them all. And so also in the case of any other common term.

In order to generalise, it is not necessary that there should be an exact resemblance between the objects denoted by a common term. Similarity in certain points is sufficient. Accidents, and non-essential attributes, are not taken into account. If accidents and subordinate properties were regarded, generalisation would be impossible, because no two objects are in every respect alike. It is by omitting minor points of difference that we proceed from individuals to species, and from species to genera.[a]

Generalisation must, in the first instance, be from individuals to species; and in illustration of the process, we may take *Socrates, Aristotle, Plato, Kant, Leibnitz, Malebranche*, &c. Now by excluding from consideration the various circumstances in which they differ from each other, and attending to the attribute predicable of them in common, we form the general notion denoted by the common term, *philosopher*. In like manner, from *Hesiod, Homer, Pindar, Sophocles, Æschylus, Virgil, Horace, Juvenal*, &c.,

[a] In early life our generalisations are involuntary; they are in a manner forced upon us by the recurrence of individual objects possessing the same marks; but when we begin to form classes for the purposes of arrangement and knowledge, we generalise intentionally.

we derive the common name, *poet;* from *Herodotus*, *Thucydides*, *Livy*, *Tacitus*, &c., the common name, *historian;* from *Demosthenes*, *Cicero*, *Hortensius*, &c., the common name, *orator*. This is the simplest form of generalising, viz., noting one common point of agreement.[a]

But we may generalise by noting in several individuals a plurality of points of agreement. If, for instance, we observe a variety of objects, and each provided with a *mast*, a *sail*, and a *rudder*, as common points of resemblance, and if we attend to these only, we form the notion expressed by the common term *ship;* and this generalised notion is applicable in the same sense to every individual ship contained under the *class* ship, since each of them possesses marks corresponding to the component parts of this common notion, as none have been taken into account except those implied by the term *ship*.

It is obvious, however, that each of the individuals denoted by this common term has certain peculiar attributes which the others have not, and which, entering into the comprehension of some particular individual, must confine the application of the peculiar attributes to some one particular ship. Hence the notion of any individual ship is more complex than that expressed by the common term; for in forming it, the distinctive marks *peculiar* to each were excluded from consideration.

[a] We are enabled not only to separate and consider singly one part of an object presented to the mind, but also to fix arbitrarily upon whatever part we please, according as may suit the purpose we happen to have in view, e. g., any individual person to whom we may direct our attention may be considered either in a political point of view, and accordingly referred to the class of merchant, farmer, lawyer, &c., as the case may be; or, physiologically, as negro or white man; or, theologically, as Pagan, Mahometan, Christian, &c. And so, in respect of anything else that may be the subject of our reasoning, we arbitrarily fix upon and abstract that point which is essential to the purpose in hand; so that the same object may be referred to various different classes, according to the occasion.—*Whateley's El.*, book I., sect. vi.

But generalisation is not only from individuals to species. We may apply abstraction to the common terms denoting species, and ascend to a class still higher. The words *dog, sheep, cow, lion, horse*, each denote a common notion obtained by abstraction and generalisation, from the individuals of which they are respectively predicable; and as in these we discover attributes common to all of them, we may resume the former process, and divest these classes of their respective formal characteristics, and express the notion comprehending all the marks in which they resemble each other by the common term, *quadruped.* Generalisation may evidently be carried to almost any extent by considering common nouns (for instance, quadruped) as *singular;* for by omitting their points of difference, we arrive at new aggregates, expressed by more general terms. Thus from quadruped we may arrive at the more general term, *animal*, and from animal we may obtain the still more general term, *corporeal being.* By proceeding in this way, laying aside points of difference, and considering only points of resemblance, we arrive ultimately at *substance* or *being*, the highest possible generalisation.

It will be seen from the foregoing, that abstraction is in a certain sense analytic in its character; for by it we separate mentally all the attributes and marks of a whole. Generalisation is, on the other hand, synthetic in its nature; for by it we collect into classes all such attributes or marks of wholes as have common points of resemblance or agreement.

It is not requisite that the individuals from which we obtain a common or general notion should co-exist. Succession in point of time is sufficient, e. g., We could have the common notion *king*, if only one had existed at a given time, in the same manner as we have the common notion *Pope*, which is founded on the points of agreement noted in a succession of individual Popes. We can reason about either of them without necessarily referring to any one individual king or Pope.

The process of abstraction, and the use of common terms, are subordinate to that arrangement and classification, without which our knowledge could not be applied to much practical use. The elements of our knowledge are almost unlimited, both in number and variety; and on this account classification becomes an unavoidable necessity. After we have abstracted and generalised accurately, we can make the results the objects of separate examination. We may, for instance, contemplate at pleasure, *number*, *form*, *weight*, *colour*, *motion*, *attraction*, *heat*, *electricity*, &c.; and the results are related to some of the most important sciences with which mankind are conversant.

It follows that the only limit to our power of forming classes is the capability of tracing differences upon which to ground distinctions; and the only rule that requires to be observed, is to make the classification subservient to our convenience, whether for the purpose of recording or examining.[a]

Common terms expressive of a class are nouns substantive; as, *field*, *flower*, *city*, *rock*, *tower*, *desert*, &c.; but points of difference, whether essential or accidental, are denoted by adjectives, and the use of the adjective is to limit the meaning of the noun to certain individuals. Of themselves, adjectives have no independent meaning; they merely indicate or connote attributes, whether of objects, of attributes, or of feelings. By means of adjectives, instead of requiring a separate noun substantive for each object to be denoted, one noun-substantive, coupled with appropriate adjectives, will serve to denote many objects. Thus we say, tall man, short man, amiable man, active man, useful man, &c. So of *colours*, we call them bright, dark, pleasing, gloomy, vivid, lively, &c.; and

[a] It is the employment of the power of generalising that constitutes the characteristic distinction between the higher and the lower animals. The highest form of instinct can neither form nor comprehend a general notion. It cannot go beyond the knowledge of an individual and its accidents.

of *characters*, we say they are just, cruel, decided, vacillating, sagacious, reflecting, &c.; and of *affections*, we say they are intense, moderate, absorbing, divided, lasting.

It may not be out of place to refer here briefly to the furious controversy which long existed between the sects of Realists and Nominalists, regarding the nature of Universals, and which only terminated when a more important question —the Reformation—diverted their attention from it. Porphyry, in his treatise on the predicables, probably originated the strife by the following passage:—'Whether,' he says, 'genus or species are substances, or exist in bare thought alone, or, supposing them to be substances, whether they are material or immaterial, and, again, whether they exist separately or in composition with sensible objects, I must decline discussing. The subject is profound, and needs a separate and more detailed inquiry.'

Averroës may be regarded as the founder of the Realists, although his view of the matter was but a species of neo-Platonism. He held that genus and species were substances, but left it matter of doubt whether these substances existed apart from matter, or whether they were to be considered as always present in the concrete.[a] Among the schoolmen, long

[a] Reid states the Platonic doctrine of ideas summarily as follows:—'Plato and his masters held that there are objects of intellect of a superior order and nature which are permanent and immutable. These are ideas, or universal natives, of which the objects of sense are only the images and shadows. To these ideas they ascribed the most magnificent attributes. Of man, of a rose, of a circle, and of every species of things, they believed that there is one idea or form, which existed from eternity, before any individual of the species was formed; that the idea is the exemplar or pattern, according to which the Deity formed the individual species; that every individual of the species participates of this idea, which constitutes its essence. Thus the idea of every species, though one and immutable, might be considered in their different views or respects—*first*, as having an eternal existence before there was any individual species; *secondly*, as existing in every individual of that species without division or multiplication, and making the essence of the species; and, *thirdly*, as an object of intellect and science in man.—*Int. Powers*, essay 5, cap. 6.

before Nominalism took its rise, this doctrine was generally considered heterodox. They acquiesced in it only in conceiving the Universal to be an *actual* existence. They held that genera and species were really existing things—that they existed actually as substances, and not merely as conceptions of the mind—that there was an universal *man* existing as one and the same in Socrates and Plato, and all the individuals of the species—and that the various individuals are formed by the addition of accidents to the species.

Roscelin of Compeigne founded the sect of the Nominalists. He held that universals were nothing but *names*. Roscelin was followed by Abelard, who held an intermediate view between absolute nominalism and realism. He believed universals to be conceptions, but without an independent and objective reality. In order, however, that these conceptions should be formed and retained in the mind, they must rest on the signs of language; but he made conceptions turn on the proposition, while Roscelin made them turn on the simple term. His doctrine, however, continued vague and assailable until the days of Occam, whose opinions correspond with that of modern conceptualists.[a] He held that genera and species existed, but existed only in the mind—that every universal is really a singular in itself, and therefore is only a universal in virtue of its signification, which is a sign of many things.[b] The following is a specimen of his reasoning:—'If the realist opinion,' he remarks, 'were true, God could not annihilate one individual without destroying all; for to annihilate one individual, he must destroy all that is of its essence. Consequently, he must destroy the universal which exists both in it and in other individuals; and these could not continue to exist when deprived of a part of their substance, such as the universal is supposed to be.'

[a] Aristotle has been claimed as a realist, a conceptualist, and a nominalist.

[b] Nullum universale est aliqua substantia extra animam existens, *Occam*.

SECTION II.

EXTENSION AND COMPREHENSION.

The *extension* of a term means the number of individual things of which severally that term may be predicated; in other words, it regards the number of species into which a genus, or the number of individuals into which a species may be divided. Thus of the term *flower* the parts of extension are *violet, lily, blue-bell, daisy, buttercup,* &c., because of all these and of as many more as answer to the description, the term flower may be predicated. For as we have seen, common terms denote a whole class, and any individual in that class; and may therefore be predicated of all or any one of these individuals.

The parts of extension of a genus are consequently the species contained under it, and of a species the individuals contained under it.

The *comprehension*—otherwise called the *intension*—of a term means all the simple notions which, taken together, make up the more complex notion signified by the term; in other words, it is the aggregate of all the known properties of a genus, species, or individual, to which it may be applied. Thus the notions of *substance, body, life, sensation,* and *reason,* are the parts of comprehension of the term *man.*

By keeping in view what is meant by the *extension,* and what by the *comprehension* of a term, it will be seen that a singular term has the least extension of all; for it can only be predicated of the one individual thing to which it belongs, while, on the contrary, a singular term has a greater comprehension than a term denoting a class, i. e., a common term.

Of common terms some have a wider and some a more restricted extension, according to the number of things to which they may be applied in the same sense. Common

terms denote an aggregate of singulars classed together, and the extension of a term will therefore depend on the amount of generality which an attribute or mark possesses, or the number of individuals to which it belongs. Thus the common term *man* has a greater extension than the common term *city*, as it can be predicated of a greater number of *individuals;* the term *city*, again, has a greater extension than the term *university*, and *tree* than *river*, and so on. The extension, therefore, or, as it may be termed, the quantity of a term, is the number of individuals contained under it, and of all or any one of which it may be predicated in the same sense.

By making terms the objects of reflection, we shall discover that some involve a smaller and others a greater number of ideas; in other words, that some are less and others more *complex*, according to the number of component parts of which they consist, e. g., The notion expressed by the term *flower* is less complex than that expressed by the term *violet* —for this reason, that the term *violet* implies all the ideas or component parts of the term *flower*, and, in addition, all the notions which distinguish that particular species of flower from all others.

It follows that the aggregate of simple notions, which make up the more complex notion expressed by a term, constitutes what is called its comprehension; and also, that different terms have a greater or smaller comprehension, in proportion to the degree of complexity they imply. This may easily be seen, by analysing or resolving a term into its component ideas or parts.

The terms instanced in, viz., *flower* and *violet*, may be viewed, then, under two different aspects—1st, With regard to the number of *individuals* of which they may be predicated; and, 2d, with regard to the complexity of the notions which they imply, or, in other words, with regard to their *extension* and *comprehension*.

On considering these terms closely, we discover that the term which has the greater extension has the smaller comprehension, and *vice versa*. The notion expressed by the term *violet* is more complex, or consists of a greater number of simple notions, than the complex notion expressed by the term *flower*, and the *individuals* of which the term *violet* may be affirmed, or which may be termed *violets*, are fewer in number than the *individuals* which may be termed *flowers*.

For in addition to the notion of an individual of the flower tribe, the term *violet* is intended to express the notions of a particular *form*, *colour*, and *fragrance* which some flowers have, and which some have not; and as these notions of *form*, *colour*, and *fragrance* are contained in the comprehension of the term *violet*, that name can only be affirmed of such flowers as have that particular form, colour, and fragrance.

It follows from this, that each component notion, in the comprehension of a term, limits the application of such term to those things which have a corresponding character; and, therefore, that the greater the comprehension of a term, the smaller is the number of individual objects to which it may be applied, or the less is its extension.

The comprehension of a term denotes its extension. Supposing that we know the term *rhinoceros* to denote an animal, and that we wish to ascertain what other animals may be called by that name, we must, in the first place, learn the exact meaning of the term, i. e., we must become acquainted with all the less complex notions, which, when taken together, form the more complex notion expressed by that term; and when we have ascertained all these, and see some other animal which does not possess corresponding attributes, we affirm immediately that this animal is not a rhinoceros, or that this individual animal is not included in the extension of the term rhinoceros, since the term can only be applied to such animals as possess attributes corresponding to the complex notion expressed by that word.

It frequently happens, that the comprehension of one term is included in the comprehension of another, e. g., The comprehension of the term *flower* is included in that of the term *violet;* for all the component notions that make up the term *flower* are implied also in the term *violet*, but it has its own peculiar attributes besides. In this case the extension of the latter must be included in the extension of the former; for since the notion of a *flower* includes in it no attributes that are not also contained in the notion of a *violet*, every individual that may be named a *violet* must possess all the attributes which the comprehension of the term flower includes, and may be therefore also named a *flower*, or is contained in the extension of the word *flower*.

Since the comprehension of a term determines its extension, it is manifest, that if the comprehension of any two terms be identical, their extension must also be identical, and that if the extension of any two terms be the same, so in like manner must be their comprehension.

It will easily be seen from the foregoing, that a singular term has, of all terms, the smallest extension, as it consists of only one individual, while its comprehension, on the other hand, must be greater than that of any common term; for peculiar attributes enter into its comprehension which cannot enter into that of any common term.

In the highest genus the comprehension is necessarily the least, and the extension greatest, while in the lowest species the comprehension is greatest and the extension least.

THE FOLLOWING SCHEME PRESENTS AT ONE VIEW THE RELATIVE NATURES OF A *WHOLE* OF EXTENSION, AND OF A *WHOLE* OF COMPREHENSION, OR INTENSION—TAKING *BODY* AS A SUMMUM GENUS :—

		Comprehension, or the simple notions which, when taken together, make up the complex notion implied by the term.	*Extension*, or the number of things of which the term may be predicated.
Genus,	Summum,	Body, ... Body,	 Stone, plant, brute, man, &c.
	Subalternum,	...Living body,	..Body with life, ... Plant, brute, man.
	Subalternum,	...Animal,	Body with life and sensation, ... Brute, man.
Species,	Infima,	Man,	Body with life, sensation, & reason, ...Man.

SECTION III.

OF THE PREDICABLES.[a]

The processes of abstraction and generalisation, as has been already observed, are subordinate to that classified arrangement of conceptions which renders our absolute knowledge practically advantageous. But, amidst the mass of general notions acquired, the mind discovers certain distinguishing qualities, which may form the basis of a new and complete arrangement of them under certain distinct heads. Many outlines for such a classification have been suggested, but that which has been generally adopted is the fivefold division into *genus* (γενος), *differentia* (διαφορα), *species* (ειδος), *proprium* (ιδιον), and *accidens* (συμβεβηκος). These are named the five *predicables* or *universals*.[b]

The term *predicable* has been defined '*nomen commune univocum secundæ intentionis*,' *or a common univocal noun of the second intension.* It is *univocal*, because, although applicable to many individuals, it is considered as representative of only *one* idea; and it is of the second intention, as being the conception of a conception.

The object of the doctrine of the predicables is to reduce to certain classes all conceivable predicates, or whatever can be logically asserted about any subject.

[a] The five heads of Predicables, or five-fold division of general names, were written by Porphyry, in the third century, as an addition to the Aristotelian Logic. They are contained in his Isagoge or Introduction to the Categories of Aristotle. That Aldrich's views differ considerably in many points from those of Porphyry, will be seen from the notes in the sequel.

[b] Aristotle's enumeration of the predicables differs considerably from that of Porphyry. The former only mentions genus (γενος), property (ιδιον), definition (ὁρος), and accident (συμβεβηκος.) Differentia has no distinct place assigned to it, but is considered as belonging naturally to the genus (ὡς ουσαν γενικην.) Species is regarded as constituted not so much by the combined notions of the genus and difference as from the marks of two concurrent or communicant genera.

There are five distinct classes of relations which may obtain between a subject and a predicate, for of any subject we may affirm its *genus*, or its *differentia*, or its *species*, or its *proprium*, or its *accidens*.

In conceiving of some imaginary common nature—as, *man*, *triangle*—we are naturally led to conceive, also, that this supposed essence or nature is composed of *parts*, and that the conception of it may therefore be resolved into more simple conceptions; for instance, the conception of *man* resolves itself into those of *animality* and *rationality*; *triangle* into *figure*, and the quality *of having three sides*. These, again, suggest other conceptions as belonging to the primary essence or nature; as, *risibility*, *nobility* to *man*; *the having three angles*; *the being equilateral* to *triangle*.

These in their order we term *the essence*, *the part of the essence*, and *the quality joined to the essence*. The essence consists of two parts, of which *one* is *common* to it, and to other essences, as *animality* is common to *man* and *brute*, *figure* to *triangle*, *circle*, *square*, &c. The *other* is *peculiar* to the essence, and distinguishes it from all others, and forms it that which it is, i. e., *rationality* distinguishes *man* from all other *animals*; *the having three sides* distinguishes *triangle* from all other figures.

But the *quality joined* to the essence may be twofold, as being either *necessarily* or *contingently* united with it. Thus with *man* the idea of *risibility* is *necessarily* joined, while the ideas of *nobility*, *tallness*, &c., are only *contingently* joined. With *triangle*, the *having three angles* is *necessarily*, but the being *equilateral*, or *isosceles*, &c., is only *accidentally* joined.

These have been termed, as above stated, the five predicables or universals. It may be proper to remark, however, that the *predicable* and the *universal* are not one and the same. The former is the sign expressive of the latter. The *predicable* is that which is *asserted of many*, and the *univer-*

sal is *one nature existing in many*, or the *ens unum in multis.*

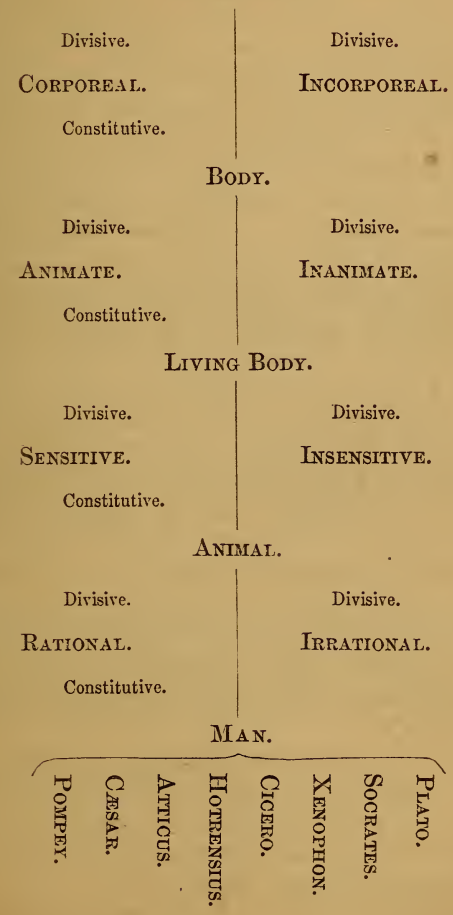
The subjoined examples may be of use to the student:—

Genus, . . .	animal.
Differentia, . .	rational.
Species, . . .	man.
Proprium, . .	possessing speech.
Accidens, . .	learned, illiterate, &c.
Genus, . . .	juice.
Differentia, . .	extracted from grapes.
Species, . . .	wine.
Proprium, . .	inebriating.
Accidens, . .	sweet.
Genus, . . .	sentence.
Differentia, . .	declaratory.
Species, . . .	proposition.
Proprium, . .	true or false.
Accidens, . .	categorical, modal, &c.
Genus, . . .	substance.
Differentia, . .	having solid extension.
Species, . . .	body.
Proprium, . .	occupying space.
Accidens, . .	white, red, &c.
Genus, . . .	water.
Differentia, . .	falling from the clouds in drops.
Species, . . .	rain.
Proprium, . .	fertilising the earth.
Accidens, . .	cold, violent, excessive, &c.
Genus, . . .	surface.
Differentia, . .	bounded by one or more lines.
Species, . . .	figure.
Proprium, . .	enclosing space.
Accidens, . .	large, small, &c.

Genus, . . .	figure.
Differentia, . .	having three sides.
Species, . . .	triangle.
Proprium, . . .	having three angles.
Accidens, . .	equilateral, isosceles, &c.
Genus, . . .	star.
Differentia, . .	wandering.
Species, . . .	planet.
Proprium, . .	describing an elliptical orbit.
Accidens, . .	seen from the earth.
Genus, . . .	institution.
Differentia, . .	possessing the highest executive power in a country.
Species, . . .	government.
Proprium, . .	able to enact or abrogate laws.
Accidens, . .	monarchial, despotic, &c.

The above examples have been selected on account of their simplicity, and with the view of showing that all the more important knowledge we possess, regarding the nature of a thing, may be briefly summed up by the five predicables. When we say, 'Man is a rational animal, possessing speech, learned,' &c., we give an adequate account of his nature. The object of all investigations into the nature of things, is to ascertain all the predicables that bear relation to them; and our knowledge must always be confined to the predications we can make with certainty. It is a simple matter to refer a species to its true genus. We readily refer *iron* to the genus *metal; eagle* to the genus *bird*, &c.; but to decide on the individual quality which essentially distinguishes one species from another, and what specific property is to be held as flowing necessarily from the essential attribute of any given species, is often a point of extreme difficulty. Even in the examples prefixed, simple as they are, many of the differentiæ and propria are by no means beyond the reach of objection.

SCHEME OF THE PORPHYRIAN TREE.



In this simple scheme of the Porphyrian Tree, *substance* is taken as the highest genus, and *man* as the lowest or *infima species;* all the other terms in the direct line between *substance* and *man* are subaltern terms. The scheme may be thus explained:—Substance, taken as the highest genus, is divided, as indicated by the term 'divisive,' into two species —'corporeal,' and 'incorporeal.' On the left side are the logical *differentiæ*, which distinguish each species from the collateral species belonging to the genus immediately above it. On the right side are the differences of those collateral species which are not specified in the scheme. 'Substance,' then, as has been said, is divided into 'corporeal' and 'incorporeal;' by combining the terms 'corporeal' and 'substance,' i. e., the differentia and genus, they constitute, as indicated by the term 'constitutive,' the species 'body,' which is one and the same with *corporeal substance.* Then, again, considering 'body' as a genus, it is divided into 'animate' and 'inanimate;' and, by combining 'animate' and 'body,' we constitute the species 'living body.' *Living body* may, however, be considered a genus, and as such may be divided into 'sensitive' and 'insensitive,' and, by combining 'sensitive' and 'living body,' we constitute the species 'animal.' *Animal* may also be considered a genus, and is divisible into 'rational' and 'irrational,' and, by uniting 'rational' and animal,' we constitute the species 'man,' which is equivalent to *rational animal.* 'Man,' however, is an infima species, and is consequently only divisible into the individuals contained under it.

The term *genus* denotes the *material*, or common part of an *essence;* *differentia*, the *distinguishing* or *formal* part of an essence; *species*, the *whole* of an essence; *proprium*, some property *necessarily* joined to an essence; and *accidens*, some property *contingently* joined to an essence.

The predicables belonging to each of these five classes are predicated or asserted in the same sense of many things,

namely, of all those objects in which the common or universal nature represented by the term is supposed to exist.

First. We can predicate of any subject its genus; as,

Violets are flowers.
Daisies are flowers.

Here the term *flowers* denotes the genus, and is predicated of both *violets* and *daisies*, two of the species comprehended under it. Or, secondly, its species; as,

This plain figure is a triangle.
This plain figure is a square.

Here the terms *triangle* and *square* denote species, and are predicated of their genus *plain figure*. Or, thirdly, its *differentia*, i. e., the formal and distinguishing part of its essence; as,

A triangle is a figure contained by three sides.

Here, *contained by three sides*, denotes the differentia, and is affirmed of *triangle*, of which alone it is predicable. Or, fourthly, its proprium; as,

Every triangle has three angles—

the property of having *three angles* being necessarily joined to the differentia, *contained by three sides*. Or, fifthly, its accidens, i. e., something accidental to it—a quality which is found in some, but not in others; as,

This triangle is *equilateral*.
Men are *wits*.
Bodies are *round*.

Here the terms *equilateral*, *wits*, *round*, are accidents to the subjects *triangle*, *men*, *bodies*.

It must be kept in view, however, that each of these heads

of predicables is a relative term; for that which is a *genus*, when predicated of some things, may be a *differentia*, *species*, *proprium*, or *accidens*, when predicated of other things.[a] In short, we cannot say what predicable any term is, or whether it is really one, until it be specified of what it is to be predicated, e. g., The term *sound* is a *genus*, in relation to the species contained under it, viz., *sharp sound*, *flat sound*, &c. On the other hand, it is the *differentia* of a *sounding body*, the *proprium* of bodies, which, from their nature, are capable of producing sound, and it is an *accident* of bodies in general.[b]

DEFINITION AND EXPLANATION OF THE FIVE PREDICABLES.

1. Of Genus.

Genus is defined to be a universal predicable, predicated in 'quid' of many things differing in *species*, as the *material* or *common* part of their essence.

Things are said to differ in *species*, or, specifically, when viewed as divided into different classes.

Terms which belong to the class *genus* express common natures, derived not immediately from the comparison of individuals, but from the comparison of several classes or

[a] Although in their application the predicables are to be viewed as relative terms, yet, when regarded as the species contained under a genus, their relation to each other is determinate and opposed.

[b] It is to be remarked of these distinctions, that they express not what the predicate is in its own meaning, but what relation it bears to the subject of which it happens on the particular occasion to be predicated. There are not some names which are exclusively *genera*, and others which are exclusively *species*, or *differentiæ;* but the same term is referred to one or another predicable, according to the subject of which it is predicated on the particular occasion. *Animal*, for instance, is a genus, with respect to man or John; a species, with respect to substance or being. The words genus, species, &c., are therefore relative terms; they are names applied to certain predicates, to express the relation between them and some given subject.—*Mill's Logic*, p. 162.

species already formed by abstraction and generalisation from individuals; and it is for this reason that such terms are technically said to be predicated of things differing in species.

The term *genus* denotes a class that has immediately under it two or more classes or species, and each of these, if not *species infima*, must have at least two other species or classes under them. It is an universal term, and the classes under it must be universal terms, i. e., they must be expressive of species or classes. Thus the genus

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comprehends under it the classes *man*, *beast*, *bird*, *fish*, *insect*, which are also all universal terms. A term, therefore, which only includes singulars under it cannot be a genus.

Genus, then, is an abridged expression of all the collected properties found in the subject species, with the exception of the *differentiæ*, and the properties resulting from them.

There are two kinds of genus, viz., *summum* and *subalternum*. The *summum*, or *highest* genus, is the last step in generalisation. Any genus that cannot be considered a species of anything, is a *summum* genus. A summum genus can therefore in no case be a species, as it manifestly can have no constitutive differentia.

Summum genus, in its strictest signification, is that all-extensive term under which every object of whatever kind may be classed, and of every one of which it may be affirmatively predicated. The word generally used to express it is *substance*, or, as some call it, *being*. It is the highest and most general notion which the mind can conceive, and cannot consequently be classed under any superior genus. Many other *generæ* are, however, frequently used as *summa genera*, according as they may be most suitable for any particular science or system. Thus by an ornithologist, *bird* would be regarded as the summum genus under which he would class the various subdivisions of birds; in like manner, *fish* would

be regarded as the summum genus most applicable to the study of ichthyology.

Any term between a highest genus and a lowest species, expresses a species with reference to the genus above it, but a genus with regard to the species below it; and such terms are respectively named *genus subalternum*, and *species subalterna*. This will be more clearly illustrated by an example:—

Highest Genus. *Lowest Species.*
SUBSTANCE, BODY, LIVING BODY, ANIMAL, MAN.

Here *body* is a species with reference to its genus *substance*, but a genus with reference to *living body*, which is one of the species included under it. *Living body*, again, is a species with reference to its genus *body*, but a genus with reference to *animal*, which is one of its subject species. *Animal*, on the other hand, is a species with reference to *living body*, but a genus with reference to *man*, being one of the species which it comprises. Man is the lowest species (species infima), including under it no terms except the *proper names* of individual men, and cannot therefore be considered a genus of anything. Species still lower might be formed, indeed, if we were to classify men according to their country; as, *American*, *Asiatic*, *African*, *European*, or, according to their *size*, *age*, or *colour;* but such classifications would proceed on accidental, not on essential distinctions.

In the series *substance*, *body*, *living body*, *animal*, man, the term *substance* is the highest genus, and cannot be a species of anything more abstract, as it is the *last* step in generalisation; and the term *man* is the lowest species, and cannot be considered a genus, as it is the *first* step in generalisation. With the exception, therefore, of the terms *substance* and *man*, every other term in the series is a *genus subalternum* with regard to the term below it, and a *species subalterna* with regard to the term above it.

In any series of this kind, it is evident that the summum genus has the least comprehension and greatest extension of all the terms, being the name of the simplest conception, and that the species infima has the greatest comprehension and the least extension of them all, although, as a universal term, it has a smaller comprehension, (as it excludes accidents) and greater extension than any of the singular terms included under it.

Genus, as already mentioned, means the *material* or *common* part of an essence;[a] and hence it can only be predicated of things differing in species. When we say violets are *flowers*, daisies are *flowers*, the affirmation is only made as to the *common* part of their essence, i. e., their common points of resemblance. Violets and daisies, and all other flowers, possess certain qualities in common, and it is upon these that the genus is founded. The characteristic and distinguishing attributes do not enter into the comprehension of the genus. But every attribute included in the comprehension of the genus is predicable of every one of its subject species.

It follows that a genus can only express an essence *inadequately*, since it merely expresses a nature common to many things, excluding from its comprehension all the distinguishing characteristics of the species of which it may be predicated.

A genus is called a *logical* or *universal* whole, because it is the most extensive term in its signification, containing

[a] From what has been said at the close of the last section, regarding realism and nominalism, it will readily be seen that the definitions here given of the predicables are strictly realistic in their character, for they cannot be defended except on realist principles; that is, that genera and species are not mere conceptions of the mind, but have an independent existence in nature. Like most of the scholastic definitions, they are simple, clear, and terse, and not likely to be replaced by anything preferable. Indeed, all definitions of the *subjective*, as the predicables are now universally regarded, are characterised by less or more looseness and vagueness; at all events, they fall short of the exactness and precision which can be secured in definitions of the *objective*. The definitions are those of Aldrich, who probably took them immediately from Albertus Magnus.

species as its subject parts, and affirmatively predicable of all of them, as may be seen from the following example, viz.:—

All { Men, Beasts, Birds, Fishes, Insects } are Animals.

Here *animal* is the logical whole, and *men, beasts, birds*, &c., its contained parts.

A logical whole—such as a genus—has only parts of extension, while a metaphysical, or essential whole—such as a species—has parts of comprehension.

Genus is said to be predicated in 'quid' (εν τῳ τι εστι). If in reference to a genus the question be asked, *Quid est illud?* the answer is, *The common or material part of the essence of many things differing in species.* Strictly speaking, however, we cannot answer the question, *Quid est?* for we do not know of anything *Quid sit*, what is its essence; and can only say *Quale sit*, i. e., we know it only indirectly through its attributes and marks.

The species into which a genus is divided are termed *co-ordinate* or *cognate* species. They are termed 'co-ordinate,' as not being *subordinate* to one another, and 'cognate,' as possessing certain marks or conceptions in common. The genus of which co-ordinate or cognate species are sub-divisions, is termed the *proximate genus* to them all, while in this case the summum genus is called the *remote genus.* All the other genera, between it and the proximate genus, are called *intermediate genera.*

II. Of Species.

Species is a predicable predicated in 'quid,' of many things differing in *number*, as the *whole* of their essence.

Things are said to differ in *number*, or numerically, when viewed as divided into *individuals*. The numerical difference is constituted by the peculiar accidents, which distinguish the individuals contained under an infima species from one another.

Terms which belong to the class *species* represent the general or common notion of some nature conceived to exist in a number of different individuals; and it is for this reason that a species is technically said to be predicated of things differing in number.

A species, then, is an abridged expression of the collective marks of the individuals contained under it, with the exception of their *accidents*. Thus *city* is a species, including *Athens*, *Rome*, *Carthage*, *Paris*, *London*, *Oxford*, &c. *River* includes the individuals—the *Tyber*, the *Scamander*, the *Halys*, the *Danube*, the *Thames*, *Isis*, *Cam*, &c. *Man* denotes a species, comprehending *Socrates*, *Plato*, *Aristotle*, *Anacreon*, *Homer*, *Virgil*, *Thucydides*, *Herodotus*, *Tacitus*, &c. *Star*, includes the *Polar Star*, *Arcturus*, *Boötes*, *Sirius*, &c.

A species is denoted by a universal term. It is any class included under a higher class, which must be its genus. We say *any* class, because a genus has generally many classes under it, and in any case must at least have two.

Species is of two kinds, viz., *species subalterna*, and *species infima*. The latter expresses the first common nature, founded on the observation of similar marks in a number of individuals. It is the first step in generalisation. A *species infima* cannot be considered as a genus with respect to anything, as it only contains individuals under it.[a] Thus the

[a] An infima species could be considered a genus, if we were at liberty to raise *accidental* differences to the rank of *essential* differences. On this supposition, we might divide *man* (an infima species) into learned and unlearned, churchman, dissenter, priest, layman, or into white, black, or red man. On this point Mr Mill remarks, vol. i. p. 164:—'By the Aristotelian logicians,

universal term *mastiff* is a *species infima*, including under it only individual mastiffs. In contradistinction to a *species subalterna*, a *species infima* is termed *species proper*, that is, the species of logic.

The attributes by which the individuals contained under a *species infima* are distinguished from each other, are *accidental*, e. g., it is accidental to a man to belong to a particular country; to be an astronomer, or botanist, &c.; but the attributes by which the different species of the same genus are distinguished from one another, are essential.

A species denotes the whole of an essence; for it is made up by the union of the genus and differentia. These are the component parts of a species; for the genus denotes the common or material part, and the differentia the formal, or characteristic part. Thus by uniting the two parts, a *plane figure* (the genus), and *contained by three sides* (the differentia), we form *triangle*, which is a species of figure.

A species can have but one differentia. This attribute is peculiar to it, and distinguishes it from every other species of the same genus; but although a species can have only one differentia, it may have many *propria*, or subordinate attributes, resulting from or accompanying that differentia.

It is obvious that the differentia cannot be included in the comprehension of the genus; for if it could, it would be common to all the species; neither can any of the attributes resulting from the differentia enter into the comprehension of the genus.

the terms genus and species were used in a more restricted sense. They did not admit every class which could be divided into other classes to be a genus, or every class which could be included in a larger class to be a species. *Biped* would not have been admitted to be a genus with reference to man, but a *proprium* or *accidens* only. It was requisite, according to their theory, that genus and species should be of the essence of the subject. *Animal* was of the essence of man; *biped* was not. And in every classification they considered some one class as the lowest infima species.'

Species, like genus, is said to be predicated in 'quid;' but species is predicated as to the *whole* of the essence of many things differing in *number*, whereas genus is merely predicated of the material or common part of the essence of many things differing in species.

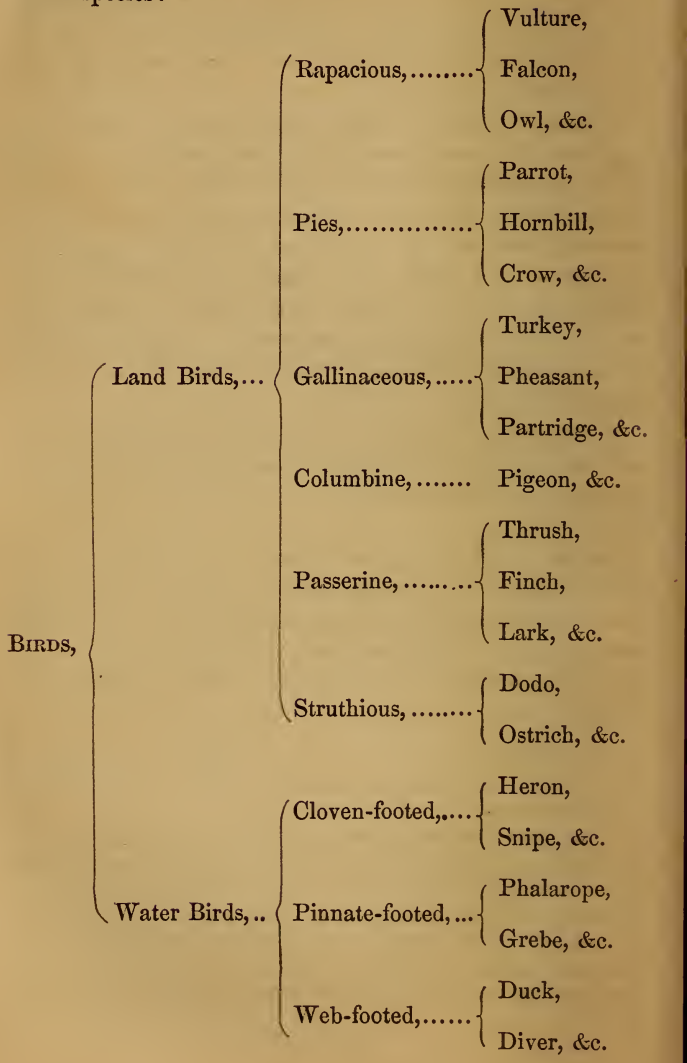
It must be borne in mind, when we speak of *species* as expressing the *whole* essence, that no predicate can completely and strictly express the *whole* essence of its subject, unless it be another word of the very same import and coextensive with it; as, *Wellington was the conqueror of Napoleon.* The words *whole essence* must therefore be understood as meaning only the *whole* that any *common* term can express, i. e., the nearest approach to the whole essence of the *individual* that any term not synonymous with the subject can denote.

When species is spoken of as a *whole*, this is properly in reference to the genus and differentia, each of which denotes a *part* of that species which is constituted by the union of both.[a]

Species being the whole essence, as explained above, necessarily *implies* the genus, which is a part of that essence. It is a more complete and comprehensive term than genus, and is therefore a *metaphysical*, or *essential* whole, e. g., *Man* is a metaphysical whole, and implies *rational animal.*

[a] The author of the 'Outline of the Laws of Thought,' in examining Aristotle's view of the predicable classes, explains species thus: 'The species may be regarded as composed not of the marks of the genus and difference, so well as of those of two concurrent or communicant genera; for the difference is but a genus which, from its overlapping part of another, is used as a distinctive mark of that part which it overlaps. If in analysing our notion of "the red flowering currant," we regard "currant" as the genus, and "red flowering" as the difference, we may also regard "red flowering" as a wide genus, wider, in fact, than "currant;" and therefore we may say, that our notion of the plant is generated by the concurrence of two genera.'—[P. 148; see also p. 39, *supra.*]

The following scheme exemplifies subaltern genera and infima species:—



DIFFERENTIA.

Differentia[a] is a predicable, predicated in '*quale quid*,' (εν τῳ ποιον τι) of many things differing either in *species* or in *number*, as the *distinguishing* part of their essence.

It has been already shown that things are said to differ in *species*, or specifically, when viewed as divided into different classes, and to differ in *number*, or numerically, when viewed only as individuals.

The differentia is the *formal* or *distinguishing* part of an essence, and is variously termed the *essential difference*, or *attribute*, the *divisive* and *constitutive* part, and, in common discourse, the *characteristic* part. It must be positive, not negative.

A differentia belongs to a species alone, and every species included under a genus must have a differentia peculiar and belonging to itself, exclusively, in order to distinguish it from every other species of the same genus. Thus under the genus *plane figure* we have the species *triangle*, *square*, *circle*, *oblong*, &c., each of which has its own *formal* or distinguishing part, in addition to the common or material part *plane figure*, e. g., the being *contained by three sides* is the essential difference of a triangle, for it constitutes the distinction between it and all other figures, since no figure can be a triangle which is not contained by three sides, nor can any three-sided figure be anything but a triangle.

The differentia first divides the genus, and then constitutes the species. Thus the genus *animal* is divided into two distinct species, by adding the attribute *rational* to one part of it,

[a] Porphyry recognises only a *relative* difference between *two given species*. Thus *rationale* is not the differentia of man *per se*, but of man as distinguished from brutes. Hence he defines man ζωον λογικον θνητον (a rational *mortal* being)—the last term being in like manner the differentia of man, as compared with the gods.—*Mansell*, p. 21.

and the attribute *irrational* to another part of it, e. g., *rational animal*, or *man; irrational animal*, or *beast.*

With respect to its dividing the genus, it has been termed *divisive* (differentia divisiva); and with respect to its constituting the species, it has been termed *constitutive* (differentia constitutiva).[a]

It is by the differentia that the various species contained under a genus become opposed to each other, and such opposition consists in each species having some one essential attribute peculiar to itself alone. In short, it signifies the attribute which distinguishes a given species from every other species of the same genus.

Porphyry gives five definitions, or, rather, explanations of the differentia, but they are all substantially one; for the same differentia is either *formal*, or *divisive*, or *constitutive*, &c., according to the view in which it is for the time regarded.

The differentia is predicated in *quale quid*, e. g., to the question, What is a man? with reference to his genus, the answer is an *animal*, but to the question *Quale animal?* what description of animal, with reference to his species, the answer is *rational.* The answer to 'quid' points out the material part, and the answer to 'quale,' the distinguishing part, and both taken together complete the species or whole essence.

GENERIC AND SPECIFIC DIFFERENCE.

There are two kinds of difference, viz., generic and specific.

Generic difference is that which constitutes subaltern species. It is termed *generic*, because the species which it constitutes may be considered as a subaltern genus, and con-

[a] Hæc divisio est ejusdem rei in diversos tantum modos; eadem enim differentia perpetuo est et divisiva et constitutiva, diverso tamen respectu.—*Sanderson.*

sequently the generic difference may be affirmatively predicated of every species which is contained under it; and hence it is predicated of things differing from each other in species, e. g., *sensitive* may be predicated of *beast, bird, fish, insect*, as well as of *man*, for it is a generic difference to all animals.

Specific[a] difference is that which constitutes infima species. It is this kind of difference which is distinctively meant by the *logical* difference. It can be predicated of all the individuals contained under the species which it constitutes, and is therefore said to be predicated of things differing in number. Thus *rational*, which is the specific difference of man, is predicable of every man, but not of any other animal.

PROPRIUM.

A *proprium* is a predicable, predicated in *'quale'* of things differing either in species or in number, as *necessarily* joined to their essence.

Terms which belong to the heads *differentia*, *proprium*, and *accidens*, are said to be predicated of things *differing either in species or in number*, because they may have immediate reference either to a *genus*, in which case they are predicated of all the species contained under that genus, or to a *species*, in which case they are predicated of the individuals from which that species is formed.

A proprium is a quality necessarily joined to an essence, but not its differentia. It is predicated universally and exclusively of all the individuals of a species, but is predicable

[a] *Specifica* (differentia) est quæ speciem infimam constituit; hæc est, quæ de numero differentibus predicatur.—*Aldrich.* This differs somewhat from the view of Porphyry, who considers the specific difference (διαφορα ειδοποιος) as opposed to *accidental difference*, (διαφορα κατα συμβεβηκος)—the former denoting the differentia proper (i. e., either constitutive or divisive) which distinguishes one species from another, whether subaltern or infima—the latter denoting the accidents which distinguish between individuals.

of no other species. A property of this description forms part of the essence of a species, and is the result of the differentia, e. g., the differentia of a triangle is, that it is 'contained by three sides;' and we cannot conceive of a figure contained by three sides but as having also three angles. The property, therefore, 'having three angles,' is the result of the differentia 'contained by three sides.' *Responsibility*, again, is a property of man, and is the result of the differentia *rational*. It is evident, however, that when we call anything a proprium, we should first know the differentia from which it flows, because a proprium must be considered as an accident, unless deduced from a known differentia.

A proprium might therefore be defined as the expression of those attributes which are observed uniformly to accompany a class, though not taken into consideration when forming it.

GENERIC AND SPECIFIC PROPERTY.

Property is divided into two kinds—generic and specific.

Generic property is that which necessarily accompanies or is joined to the essence of the summum or subaltern genus.[a] It is evident from this that generic properties may be predicated of many species, and of all the individuals contained under them, while specific properties can only be predicated of the different individuals contained under one species, e. g., the property in triangles that 'the three angles are equal together to two right angles' is a generic property, and may be predicated of all triangles.

[a] Genericum est, quod necessario comitatur essentiam generis summi vel subalterni.—*Aldrich*.

On the principles of Aristotle and Porphyry, a generic property can only be regarded as a property with respect to the highest species of which it is predicable. As regards all subordinate species, it must be considered as an *accident*. *Mobile*, for example, a property of *corpus*, is an accident to *animal* and to *homo*, as not convertible with them.—*Mansell*, p. 28.

Specific property is that which flows from the essence of the species infima,[a] and is predicated of one species and its different individuals, e. g., the property that 'all equilateral triangles are also equi-angular,' is a specific property, and can only be predicated of that species of triangle which is termed 'equilateral.' Generic property is predicable, then, not only of species, but also of the various individuals contained under those species. Specific property is only predicable of the individuals contained under one species.[b]

Proprium has also been divided into four kinds:—

1. That which is peculiar to one species, but not *universally* found in its contained individuals. Thus it is proper to man alone to be a *physician* or *statesman*, though all men are not so.

2. That which is predicable of the whole species, but not of that species alone, i. e., found in every individual of a species, but found also in other species. Thus *malleability*,

[a] *Specificum*, quod fluit ab essentia speciei infimæ.—*Aldrich.* This view of property is not countenanced either by Aristotle or Porphyry. Instead of considering it as flowing or resulting necessarily from the essence, they regard it as simply convertible with its subject. Aldrich's view is, however, a very old one, and is probably traceable to the Arabians.

[b] The difference and specific property are often difficult to distinguish from each other; but it should be remembered that a property is only joined to an essence, and results from the difference; whereas the difference is a constituting part of the essence. If, then, any part of an essence be supposed to be taken away, that essence can no longer remain as it was. The following test, therefore, will in most cases succeed:—Since the genus and difference united form the species, it follows that if the difference be supposed to be taken away from any species, that species must revert to its subaltern genus—in fact, the species will no longer exist; but if a property be supposed to be taken from it, the essence, i. e., the species, will not thereby be injured.—*Huyshe.* In illustration of this, let us take the following example:—From the species 'rational animal' suppose 'rational' to be taken away, and the species immediately reverts to its subaltern genus 'animal'—but suppose, again, the property 'speech-possessing' to be taken away, the species 'rational animal' would not thereby be destroyed.

fusibility, *weight*, *value*, are predicable of gold, but not of gold only.

3. That which may be predicated of all the individuals of a species, and of that species only, but not always. Thus, *vines bear grapes; man is a laughing animal.*

4. That which may be predicated universally, peculiarly, and at all times, of one species only and its individuals. Thus it is the property of every circle, and of circles only, that the lines drawn from the centre to the circumference are all equal.[a]

Of these four classes the first is only an accident of the species, and cannot therefore be strictly termed a property. Every property must be applicable to *all* the individuals of the species, and must belong to that species necessarily, as flowing from the differentia. A property differs from an accident in this, that it can be predicated of its species, and *vice versa.* They are reciprocally predicable, e. g., *man is a being subject to law. A being subject to law is a man.* The two propositions are simply convertible. An accident and its species are not, however, reciprocally predicable. We can assert that *every statesman is a man*, but we cannot say that *every man is a statesman*, because the being a statesman is only predicable of some men, and consequently not universally found in the members of the species.

The second is the *generic* property. It is characteristic of

[a] Quod convenit soli sed non omni, ut *homini esse grammaticum.*
Quod convenit omni sed non soli, ut *homini esse bipedem.*
Quod convenit omni et soli sed non semper, ut *homini canescere.*
Quod convenit omni soli et semper ut *homini risibilitas.*—*Aldrich.*

On the above examples Mansell remarks (p. 28): 'The ἴδιον of Porphyry answers to the fourth kind of property mentioned in the text. The other three are *accidents*, the first and third separable, the second inseparable, but still only an accident, as being predicable of more subjects than *homo.* On the scholastic theory, it is also an accident, as not flowing necessarily from *rationale*, the differentia.'

a genus, and predicable of the different species under it, but it is not characteristic of a species as such.

The third is not sufficiently distinct from the first to require separate notice.

The fourth is the specific property, and is that alone which constitutes the proprium of logic.

ACCIDENS.

Accidens is a predicable predicated in 'Quale' of many things differing in species or in number, as *contingently* joined to their essence .

An accident denotes something contingently joined to an essence, e. g., the being 'equilateral' or 'right-angled' is an accident to a triangle, for such attributes do not necessarily belong to a triangle, since every accident must be separable from the species, otherwise it would be a property.

Accidens is divided into two kinds—*inseparable* and *separable.*

The inseparable accidents are such as cannot be separated from the individuals of which they are predicated. They are circumstances which have happened in past time to some members of a species, and cannot now be separated from them, e. g., the *place of birth*, the *parents*, the *past events of life*, &c., are inseparable accidents to any individual man. The circumstance or fact of having been born at Mantua, has no conceivable relation to Virgil as one of the species *man*, but, as an individual, the circumstance is inseparable from him. This class of accidents may be predicated of their subjects at all times.

The separable accidents are such as can be separated from the individual, e. g., a man's *dress*, *posture*, *residence*, *opinions*, &c., are separable accidents. This class of accidents can only be predicated of their subjects at certain times.

An inseparable accident is predicable only of individuals;

for all accidents are separable from the genus and species; but with regard to individuals, they are separable or inseparable.

The last three heads of predicables, viz., differentia, proprium, and accidens, are predicated of things differing as well in number as in species, because they have a relation either to a genus or a species. If they relate to a genus, they can be predicated of all the species which that genus contains; and if they have reference to a species, they can be predicated of all the various individuals under that species.

In conducting classification on a great scale, as in natural history, the technical designations furnished by the predicables are found to be too few. Others have therefore been invented chiefly to express the varieties of *intermediate genera*. Those best known are used in the Linnæan system, and consist of five kinds—1. *Classes*, corresponding to summa genera; 2. *Orders*, corresponding to intermediate genera; 3. *Genera*, confined to the proximate genera; 4. *Species*, confined to the co-ordinate species under each genus; 5. *Varieties*, including the species infima, and all divisions depending merely on accidental, or on some of the less important proper qualities. Other systems employ a still greater variety of designations, e. g., *divisions, classes, orders, tribes, families, legions, sections, sub-divisions*, &c.

THE FOLLOWING SCHEME PRESENTS SUMMARILY THE HEADS OF PREDICABLES, WITH THEIR SUB-DIVISIONS:—

EVERY PREDICABLE MUST EXPRESS EITHER—

- Part of the essence,
 - The material part, or genus,
 - Subalternum.
 - Summum.
 - The formal part, or differentia,
 - Specific.
 - Generic.
- or the whole essence or species,
 - Infima.
 - Subalterna.
- or something joined to the whole essence.
 - Necessarily joined, or proprium.
 - Specific.
 - Generic.
 - Accidentally joined, or accidens,
 - Separable.
 - Inseparable.

SECTION IV.

OF THE CATEGORIES OR PREDICAMENTS.[a]

The five predicables or universals, as has been shown, do not express any actually existing thing; they are merely terms expressive of common notions, and present them as classified under certain distinct heads. They express second, not first notions. In nature we find no actually existing thing corresponding to genus, species, or any of the other predicables. They indicate *conceptions*, not *realities*.

Second notions, however, presuppose first notions, and as under the predicables we classify conceptions, so under the categories we classify realities, or distribute into classes all the possible real things about which we can discourse.

In short, a perfect list of categories or predicaments would be a classification of whatever can be the subject or predicate of a proposition,[b] while the predicables are a classification of all the possible affirmations about these things.

The usual distribution of the categories, according to the Aristotelian school, is into ten; and it is supposed that to some one or other of these heads of division any term expressing a first notion may be referred. The division is as follows, viz.:—[c]

Ουσια . . .	substantia . . .	substance.
Ποσον . . .	quantitas . . .	quantity.

[a] They are termed *categories* from the Greek noun substantive κατηγορια, and *predicaments* from the Latin rendering, *predicamentum*. The categories are said to have been first classified by Archytas of Tarentum; but of this there is no certain evidence.

[b] In this the categories of Aristotle are defective; for many things that form the subject and predicate of a proposition are excluded in the enumeration, such as *entia rationis* (beings of the reason) and *second notions*.

[c] The Pythagorean, Platonic, and Stoic schools among the Greeks, had each a favourite enumeration of categories.

Ποιον . . .	qualitas	quality.
Πρός τι . . .	relatio	relation.
Που . . .	ubi	where.
Ποτε . . .	quando	when.
Κεισθαι . . .	situs	posture.
Εχειν . . .	habitus	habit.
Ποιειν . . .	actio	action.
Πασχειν . .	passio	suffering.

To some one of these heads we may refer every term, according as may best suit our purpose, for the subject under discussion.

Substance[a] (answering to the question, 'Quid est?') considered without reference to inhering qualities, has been defined *quod sub se stat*, i. e., which supports itself, or which, in the mode of its existence, is independent of everything else. With reference to inhering qualities, it has been defined *ens per se subsistens et substans accidentibus*, i. e., an entity having independent existence and supporting qualities. The substance is the *ens*, the self-existing thing; the accidens is the *ens entis*, which may be freely rendered the mode, quality, or accident of the self-existing entity.

Substance is divided into first and second substances. Individual things are first substances; as, *Socrates*, *Bucephalus*, *this castle*, *that tree;* second substances are denoted

[a] The words *substance*, *entity*, *being*, are each of them less or more ambiguous in their signification. Of substance, in its philosophical sense, we have no direct knowledge; we only know it indirectly or through attributes, but when in a familiar language we use the word substance, we are supposed to mean by it some really existing object or thing cognizable by the senses. Entity and being are in their strict meaning synonymous, being both immediately connected with a verb which simply denotes mere existence. 'Being' is, however, commonly used as a synonym for substance, with this difference, that *being* is applied equally to mind and matter, while *substance* rather suggests the idea of matter only. Being and entity should be understood as implying mere abstract existence, and never separate existence, as cognizable by the senses.

by common or general terms, which merely denote creations of the mind; as, *man*, *animal*, *body*. This category includes whatever constitutes the very being of things, and of which all objects of thought are modifications; substances are divided into *self-existent* and *dependent*, *material* and *immaterial*, &c.

Quantity.—The answers to the questions, How great? How many? How long in time? &c., fall under this category. It includes all things capable of being measured or numbered. Quantity is divided into *continuous* and *discrete*. Continuous quantity is that whose parts are united by some common boundary, such as magnitude, or the modifications of extension, having permanent continuity; and time and motion having successive continuity. Discrete quantity is that whose parts have no continuity, such as number, to which sound and speech are sometimes added.

Quality, (answering to the question 'Quale?') includes the properties which principally distinguish or characterise objects. It is divided into *natural* or *innate* powers and properties, as the mental faculties and the capabilities of objects; *acquirements*, such as learning, virtue; *sensible qualities*, such as sounds and colours, and forms or figures, with all their modifications.

Relation includes all the circumstances about objects which imply a connection with others, in considering which we may observe both the *principle* of the relations, and the *things* related, called correlatives, e. g., the consideration of *master* implies *servant*, and of *pastor*, *flock*, &c.

Place (answering to the question Ubi?) includes all the modifications of space, and the more general relations of objects to space.

Time (answering to the question Quando?) as to-morrow, yesterday, in the year of the building of Rome; but *time* implied by the question *quando*, must not be confounded with the time denoted by the question *quam diu;* the latter is

continuous time; as, a month, a year, and belongs to the second category.

Posture includes chiefly the relations of objects to one another as occupying space, such as the relations of the constituent parts of objects, the relations of parts to the whole, and the relations of entire objects to one another in their attributes, combinations, &c.

Habit expresses what anything has; as, *to be clothed, to wear shoes, has a ring*, &c. It should be noted, however, that 'clothes,' 'shoes,' &c., do not of themselves imply habit; this is only predicable of them when possessed.

Action includes all the varieties of causes, or all the ways in which objects may produce changes in others.

Passion includes whatever implies the notion of *suffering*, and all the varieties of effects, or the ways in which objects may undergo changes.

Various objections have from time to time been made to the Aristotelic enumeration of the categories, and probably upon satisfactory grounds; it is questionable, however, whether a more satisfactory classification has yet appeared. The Aristotelic categories are adopted here, as deduced and simplified by Sir W. Hamilton: 'They' (the ten categories) 'are all divisions of *being*,—*ens*. Being is divided into *ens per se*, and *ens per accidens*. *Ens per se* corresponds to *substance*, the first of the Aristotelic categories. *Ens per accidens* comprises the other nine; for it either denotes something *absolute* or something *relative*. If something absolute, it either originates in the matter of the substance, and is divisible—*quantity*, Aristotle's second category; or in the *form*, and is indivisible—*quality*, Aristotle's third category. If something relative, it constitutes *relation*, the fourth category; and to relation the other six may easily be reduced. For the fifth, *where*, denotes the relation between different objects in space, or the relation between place and the thing placed. The sixth, *when*, denotes the relation between objects in succession, or the relation between time

and a thing in time. The seventh, *posture*, is the relation of the parts of a body to each other. The eighth, *having*, is the relation of the thing having and the thing had, while the ninth and tenth, *action* and *passion*, are the reciprocal relations between the agent and the patient. There are on this scheme one supreme category—*being;* two at the first descent, *ens per se*, *ens per accidens*, four at the first and second, *substance*, *quantity*, *quality*, *relation*, and to the dignity of category these four are, of Aristotle's ten, pre-eminently, if not exclusively, entitled.'

Locke has reduced all things to three classes, viz., *substances*, *modes*, and *relations*.

Hume classifies all things under the two categories of *ideas* and *impressions*.

Kant's list amounts to twelve, viz., unity, plurality, totality, affirmation, negation, limitation, independence, dependence, interdependence, actuality, possibility, and necessity.

Mr Mill's categories are four in number, viz., 1. Feelings, or states of cousciousness; 2. Minds which experience these feelings; 3. Bodies or external objects which excite certain of these feelings, together with powers or properties whereby they excite them; and, 4. The successions and co-existences, the likenesses and unlikenesses, between feelings and states of consciousness.

The author of the 'Outline of the Laws of Thought' proposes the following scheme:—'Conceivable things,' he says, 'are substance and attribute.' He subdivides attribute into quantity, quality, relation, and relation into that of time, of space, of causation, of composition, of agreement and repugnance, of polar opposition, of finite to infinite.

'Most of these names,' he remarks, 'will be easily understood: the relation of polar opposition may not be so. We find that, in different parts of the field of knowledge, pairs of things unite and form a new whole different from either of them.' He gives, as examples, the doctrine of the Mean in morals; in chemistry, the neutral salts, &c.

A facetious mathematician, of the last age, was of opinion that all the predicaments of the peripatetics might be substituted by these two, viz., *data* and *quæsita*.[a]

SECTION V.

DIVISION.[b]

Division literally signifies the separation of the component parts of some *really* existing *whole*, as when we divide a *tree* into its several parts; as, *root*, *trunk*, *branches*, &c.

In a division of this nature, each of the parts is strictly and properly a 'part,' and is really less than the whole; for it cannot be affirmed of any part separately, that it is a 'tree.' A whole of this description is said to be a *real* or *physical* whole. It follows that physical division can only be applied to *individuals*.

As recognised in logic, division is used in a figurative sense, and means the distinct, i. e., the separate enumeration of the several things signified by a common term.[c] It is therefore on common terms only, as denoting classes, that logical division can operate. A whole of this kind is said to be an *ideal* or *metaphysical* whole.

If we consider the common term *tree* as a genus, and proceed to divide it, the word 'division' will be used in its

[a] It is still an open question whether the categories ought to be referred to metaphysics, logic, or grammar. The weight of opinion is, however, in favour of their being considered a metaphysical distribution.

[b] Boethius is the chief authority on the doctrine of 'division.' His treatise *de divisione* is founded on a work on the same subject by Andronicus Rhodius, a peripatetic.

[c] Distincta enumeratio plurium quæ communi termino significantur.—*Aldrich*.

figurative sense; for since there is nothing in nature corresponding to the common term 'tree,' it follows that it cannot be divided into really existing parts. The only division of which it is susceptible is the distinct enumeration of the several species contained under it—such as *oak*, *elm*, *ash*, *birch*, *fir*, &c. These are called parts, but they are so in a figurative, not in a real sense, since each of the parts, as regards comprehension, is greater than the whole divided, for in addition to the common nature (i. e., the genus) predicable of oak, elm, &c., each of them implies a differentia or distinguishing characteristic, which is not predicable of the genus 'tree.' This kind of division is distinctively named *logical* division.

It follows, from the nature of logical division, that any term denoting some really existing individual thing cannot be logically divided; and hence a term of this description is in logic termed indivisible (*ατομον*), but any term denoting a genus admits of logical division. To enumerate, therefore, the various co-ordinate species of which a genus is composed, is to *divide* such genus.[a]

[a] Logicians enumerate *wholes* of various kinds. 1. A *Logical* or *universal* whole is a genus. The genus *animal* may be divided into *men*, *beasts*, *birds*, *fishes*, and *insects*. A whole of this description is termed universal, as the term denoting it must be a common or universal name. 2. An *essential* whole is one to which all its parts are essential; the parts are said to be *constitutive* (partes constitutivæ), and if from an essential whole any of the parts be taken away, the whole is destroyed, as all the parts are essential to its existence. An essential whole is either *physical* or *metaphysical*. A physical essential whole is made up of parts that have real existence, e. g., a *body* consists of *matter* and *form*; a *man* consists of a *human body* and a *rational soul*. A metaphysical essential whole is one whose parts have no real existence. It is the same with the logical whole explained in the text. 3. An *integral* whole is some actually existing thing, and consists of integrant parts (partes integrantes), and these, according to the nature of the wholes, may be *members*, *parts*, or *particles*, e. g., the human body is an integral whole, consisting of *head*, *arms*, *legs*, &c.; a book is an integral whole, the parts of which are *leaves*, *back*, *cover*, &c. When an integral whole is made up of particles of the same kind, as a *slab of marble*, it is called a *homogeneous* whole; but when it consists of parts or members, it is

RULES OF LOGICAL DIVISION.

1. The parts, i. e., the constituent species, must together be equal to the genus divided.

The following are examples of logical wholes, where the constituent species taken together are equal to the whole divided:—The *imponderable bodies* are 'light,' 'caloric,' 'electricity.' *Oratory* is either 'deliberative,' 'forensic,' or 'demonstrative.' *Theology* is either 'biblical,' 'systematical,' or 'historical.'

2. The constituent species, i. e., the dividing members, must exclude one another.

This rule is merely a caution against any contravention of the first, and it can be best illustrated by examples, in which the dividing members (*membra dividentia*) do not exclude one another, e. g., suppose we divide *cause* into *efficient*, *material*, *formal*, *final*, and *instrumental*, the members of the division would not exclude one another, for the 'instrumental' is included in the 'efficient.' Or let the whole to be divided be *imaginative writers*. Now if we divide these into the species 'poets,' 'dramatists,' and 'writers of fiction,' the parts do not exclude one another, i. e., they are not opposed, for some poets are dramatists, and some works of fiction are rythmical. Again, should we divide *government* into *patriarchal*, *despotic*, *monarchial*, *democratic*, and *republican*, the dividing members would not exclude or be opposed to one another; for a patriarchal government may be despotic, and *vice versa*, and a democracy and a republic can only differ in accidental circumstances.

called a *heterogeneous* whole. An integral whole may be deprived of a non-essential part, without injuring its existence.—[This note is, in substance, taken from *Wallis* and *Sanderson*.] Any species subalterna may be considered a logical whole, as classes are its contained parts. A species infima is not, however, a logical whole, as its subject parts are individuals, not classes, and individuals are distinguished by accidents, not by differentiæ.

The Porphyrian division of the predicables into *genus*, *species*, *differentia*, *proprium*, and *accidens*, is a correct and familiar exemplification of this rule. On the other hand, the operations of the mind, viz., *simple apprehension*, *judgment*, and *reasoning*, would be a cross division, inasmuch as judgment is presupposed in simple apprehension as well as reasoning.

3. The division must proceed on one principle.[a]

This rule has particular reference to the point of view in which we are to consider the whole to be divided, e. g., *animals* may be divided on one principle (*fundamentum divisionis*) into *rational* and *irrational*, on another principle into *gressilia*, *volatilia*, *natatilia*, *reptilia*, and *zoophyta*, or, again, into *cold-blooded* and *warm-blooded*. If, however, we were to intermix the members of these several modes of division, we would be introducing a different principle from that which we set out with, and, consequently, the division would be incorrect.[b]

But the above refers merely to wholes of extension. There are also wholes of comprehension. In the former we separate or enumerate the co-ordinate species; in the latter we resolve

[a] We must be careful to keep in mind the *principle of division* with which we set out, e. g., whether we begin dividing books according to their *matter*, their *language*, or their *size*, &c., all these being so many cross divisions. And when anything is capable of being divided in several different ways, we are not to reckon one of these as the true, or real, or right one, without specifying what the object is which we have in view; for one mode of dividing may be the most suitable for one purpose, and another for another, as one of the above modes of dividing books would be the most suitable to a bookbinder; another in a philosophical, and another in a philological view.—*Whateley*, book II.

[b] The principle of division mentioned is the point of view from which we are to regard the conception to be divided; for we may divide one many times in various points of view. Thus man may be divided into European, Asiatic, African, American, and Australian, or, again, into Christian, Mahometan, and Pagan, or, again, into just and unjust; and in the first division *locality*, in the second *religion*, and in the third *behaviour*, is the principle of division.—*Outline of the Laws of Thought.*

the more complex conception into the simple conceptions of which it is composed. The one analyses the extension or denotation, the other the connotation of a term. In a whole of comprehension[a] we divide, as it were, the ideas or conceptions; whereas in a whole of extension we separate the species.

The following are examples of wholes of comprehension:—

Goodness of memory may be resolved into the conceptions of 'susceptibility,' 'retentiveness,' and 'readiness;' *Repentance* into 'confession,' 'contrition,' and 'amendment;' *Gratitude* into a 'consciousness of favour received,' 'a disposition to acknowledge it on every proper occasion,' and 'a resolution to seize the first opportunity of returning a similar favour to the benefactor.'

Boethius enumerates three kinds of division,—1st, The division of a genus into its subject species, which is distinctively named logical division, as mentioned above. 2d, The division of a whole into its parts, corresponding to *physical* division, with this difference, that Boethius includes under this head the individuals contained under an infima species, which must be referred to logical division, if to any; but the difficulty of enumerating the number of individuals contained under it, would render it in almost every case impracticable; and, 3d, The division of an equivocal term into its various meanings. This species of division is sometimes termed *distinction*, and is restricted to the division of equivocal terms or names; it amounts to nothing more than an explanation of the various senses in which an equivocal term may be understood.[b] In many cases a perfect division may be obtained

[a] The parts of a whole of extension are connected by a disjunctive conjunction, and of a whole of comprehension by a copulative conjunction.—*Wyttenbach.*

[b] The test of this is, that the name is predicable of each member, but not the same definition.—*Mansell*, p. 30.

It may be observed, that it is frequently necessary, in examining the arguments of another, to mark the different senses in which we may understand a

by the use of the *definite* and *indefinite* nouns. As already stated, a noun is said to be indefinite to which the particle '*non*' is prefixed, and definite when this particle is not prefixed. By this manner of division, a whole is divided into two parts, one of which must be immediately opposed to the other, e. g., *men* may be divided into those who are *Europeans* and those who are *not* Europeans; *animals* into *bipeds*, and *not bipeds*, or into *rational*, and *not rational*, or *irrational*. A logical division of this kind, according to the old logicians, has a Nomen Finitum, the name of an exhaustible kind, on one side, and a Nomen Infinitum, the name of an inexhaustible kind, on the other. This division into two members, usually termed *dichotomy* (διχοτομια), from its simplicity, shows more readily and plainly than any other, that the dividing members are distinct and opposed; for the union of the two members will be equivalent to the whole divided, and secures, therefore, the requisites of good division mentioned in the two first rules.[a] On the other hand, however, it is comparatively useless, because of one of the dividing mem-

word or proposition that we employ, and to distinguish them carefully. For instance, a proposition may in one instance be true, and in another false or doubtful. And many writers take advantage of this ambiguity, confounding the two senses, displaying its truth and certainty, in the sense which is indubitable, but which perhaps makes nothing for their argument, and then applying it to their argument in the other sense, in which it is by no means true or certain.— *Walker's Commentary*, cap. 10.

[a] Cicero mentions only two kinds of division, viz., partition and division, and explains their respective significations thus: 'Sed quid inter se differant planius dicendum est. In partitione quasi membra sunt, ut corporis, caput, humeri, manus, latera, crura, pedes, et cetera; in divisione, formæ sunt, quas Græci ἰδεας vocant; nostri, si qui hæc forte tractant, *species* appellant.—*Top.*, cap. 6, 7.

A rule of division often laid down is, that it should be into its proximate parts, i. e., that the dividing parts should be of the same degree in the predicamental line, no one of them of a higher species than the others; in other words, that they should be equidistant from some common antecedent genus.

bers, and that generally the larger, we know nothing, except that it wants the leading characteristic of the other; in other words, a differentia is affirmed of one of the parts into which a whole is thus divided, but denied of the other; so that we can only have a distinct conception of one of the parts, viz., that which has the differential attribute. All we can know of the other part is, that it is not contained in the class specified by the differentia. Division by dichotomy, or bipartite division, is usually attributed to Peter Ramus. He and his followers were attached to it; but it had been a favourite with Plato and others long before his time. Both Plato and Ramus used dichotomy by contradiction. Aristotle approved of that by contraries, but rejected that by privative and indefinite terms. Boethius sanctions the use of contraries, contradictories, and also positive and privative terms, but discards relatives.

Those who hold logic to be purely a formal science, must of necessity hold division by dichotomy to be the only logical mode, for any other description of division implies a knowledge of the *matter* of the whole divided. It may be fairly questioned, however, whether division by dichotomy, as well as other modes, does not imply a knowledge of the matter, although possibly in a more restricted degree.

SECTION VI.

DEFINITION.

Definition (ὁρισμος) literally signifies the laying down the boundary of a thing; but in logic it signifies an expression of thought in language which so explains a term as to separate it from any other, and thus to lay down, as it were, the limit of its signification; like division, it is used in a figurative sense.

Correct definition subserves a two-fold object. It either conveys to the mind of a hearer the exact conception which the term defined represents, or it may correct any indistinct or inaccurate notion he may have previously entertained regarding it. The first object presupposes that the hearer is altogether ignorant of the meaning of the word or thing defined; the second implies that a conception is conveyed to his mind more correct than that previously entertained.

Definitions are of two kinds, viz., *nominal* and *real.*

In *nominal* definition we merely explain the meaning of a term, with the view of guarding against ambiguity in the use of it, or misconception of its exact import. In this case the meaning of the term to be defined must be explained by some equivalent expression, which must be more intelligible,[a] e. g.,

The *Decalogue* is the ten commandments.
The *Pentateuch* is the five books of Moses.
A *telescope* is an instrument for viewing distant objects.

In many cases, the nominal and real essence of a thing

[a] Nominal definition, as understood by Aldrich, 'Homo, *qui ex humo* (an unfortunate example, by the way) should more properly be termed definition by etymology, for it merely explains the original import of the word. It is questionable, however, whether a definition of this kind should be considered a definition at all, for in the modifications words undergo in meaning, as applied in language, their etymological signification is often completely lost sight of. Definition, by a synonymous term, as 'honesty is probity,' is also comparatively useless, for the synonym used to define may not convey a more distinct conception than the *definitum* or thing defined. Neither of these methods is Aristotelic, although they can both be traced back to an early period.

In a rhetorical point of view, however, definition by etymology may be very effective. In Cicero's definition of fortitude, viz., 'virtus pugnans pro æquitate,' the remains of the original sense of *virtus*, manhood, give a beauty and force to the expression, which cannot be preserved when translated into another language. The Greek Αρετη, and the German *Tugend*, originally denoted *strength*, afterwards *courage*, and at last *virtue*. The happy derivation of *virtus* from *vir*, gives an energy to the phrase of Cicero, which illustrates the use of etymology in the hands of a skilful writer.

exactly coincide, i. e, the idea conveyed by the term is the same as the nature of the thing. Thus a triangle is 'that which has three sides,' which is both a nominal and real definition.

In *real* definition we explain not only the meaning of the term, but also the nature of the thing signified by it.

Real definition is of two kinds, *accidental* and *essential*, otherwise called *imperfect* and *perfect*. It is common to both that they are used in explaining *things*, not *names*.

In accidental definition, we describe or enumerate some of the *properties* or *accidents* of what is implied by a term. This kind of definition is therefore usually termed description. Any definition may be considered accidental, where only the genus and a property occur; for a property must in all cases be regarded as an accident, unless it is deduced from a known differentia. The following are examples of accidental definition.[a]

A *ball* is a figure that has an aptitude to roll.

Heat is the sensation produced by approaching fire.

Man is a risible animal.

Animal is a body which can move itself from place to place.

Ink is a liquid used for the purposes of writing and printing.

Accidental definition is frequently the only method by which we are able to define a thing or term representing it, in consequence of our ignorance of the characteristic quality which constitutes the differentia. In such cases, we often find it necessary to enumerate a number of marks or attributes, the aggregate of which must be considered as the differentia, until we are able to single out some particular attribute suffi-

[a] An accidental definition never includes a differentia. The conceptions embraced in it are those of a genus and one or more properties. Porphyry and Boethius reject it; but it has been adopted by some more recent writers. A definition of this kind is properly *description*, and not definition.

cient of itself to distinguish its subject from all others. Cases of this nature are constantly occurring in Botany, Natural History and Mineralogy.

In *essential definition* we lay down the constituting parts of the essence. It is of two kinds, viz., *logical*, or *metaphysical*, and *physical*. In logical definition we lay down the ideal parts, i. e., the proximate genus and differentia.

This is of all kinds of definition the most perfect. It follows that any term that can be logically defined must be expressive of a species. The following may suffice as examples:—

Man is a rational animal.

Rhetoric is the art of speaking persuasively.

Slavery is compulsory subjection to a master.

A *parallelogram* is a four-sided figure, the opposite sides of which are parallel.

Belief is assent produced by apparent credibility.

A *proposition* is a declaratory sentence.

In *physical definition,* we lay down the really existing and distinct parts of an essence, i. e., parts that admit of actual separation. In essential definition this is not the case, for genus and differentia are only distinguished by the understanding. The following are examples of physical definition:—

An *animal* is a living body, consisting of head, body, legs, &c.

A *tree* is that which consists of root, trunk, branches, leaves, sap, &c.

A *house* is a structure composed of foundation, walls, roof, chimneys, &c.

For the sake of clearness, the various kinds of definition already explained may be illustrated by one example:—

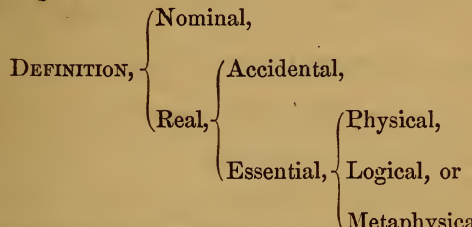
Nominal.—A proposition is that which is proposed to the mind for its assent or rejection.

Accidental.—A proposition is the verbal expression of an act of judgment.

Logical.—A proposition is a declaratory sentence.

Physical.—A proposition is that which consists of a subject, predicate, and copula.

The following scheme presents the different kinds of definition, as laid down by Aldrich, 'definition' being used as the summum genus:—



The rules of definition are three—

1. The definition must be adequate to the term defined.[b]

The conception intended to be conveyed by the definition must be exactly equal to the *definitum* or term defined.[c] Hence the definition must neither be too extensive nor too narrow. It will be too narrow if it omit any essential attribute, and too extensive if it include any as essential attribute which does not belong to it. As in adequate logical division, the whole and the dividing parts should reciprocate; so in

[a] Aldrich illustrates the various kinds of definition thus: 'Man, *nominally*, qui ex humo; *accidentally*, an unfeathered two-legged animal; *logically*, a rational animal; *physically*, a being consisting of an organised body and a rational soul.'

[b] A definition may be inadequate in two ways—either if it be not applicable to the whole thing defined, or if it be applicable to anything else than the thing defined.

[c] There are three cases in which logical definition is inapplicable: 1. *Summa genera*, which have no higher genus, and consequently, no constitutive difference; 2. *Individuals* which have no essential difference, and can only be defined by description, i. e., by enumerating the accidents belonging to individuals, whereby the differences between them and any other may be shown; and, 3. The names of *simple ideas*, viz., intuitions, which, from their nature, can have no complexity.

adequate definition the *definitum* and its definition should also reciprocate, i. e., be simply convertible.

The adequacy of any definition may be tested in this way. The following are examples of adequate definition :—

Wine, a juice extracted from grapes.

Conscience, the faculty by which we judge of right and wrong.

Pension, an allowance for past services.

The following examples err by excess :—

An *insect* is an animal that flies.

Man is an intelligent being.

In the first example the definition is too extensive, being applicable to birds as well as insects; in the second, the definition applies to all intelligences as well as to man. The definitum and definition are not, therefore, simply convertible, or do not reciprocate.

The following examples, on the other hand, err by defect :—

Man is a civilised, rational animal.

Here the definition is too narrow, for it excludes uncivilised man.

A *religious person* is one who holds the peculiar doctrines of Calvin.

This definition is also defective, for many persons who must be accounted religious reject some of Calvin's doctrines.

2. The definition must in itself[a] be clearer than the thing defined.

[a] It has frequently been objected to metaphysical definition, that it is not clearer, in most cases, than the term defined; and when the term which is to be defined is very familiar to the hearers, this certainly is the fact. Thus the word *man* is more familiar to the ear, and is accidentally better known than the term *rational animal*; but yet the words 'rational animal' are in their nature more clear and better known than the word 'man,' inasmuch as they convey less complicated ideas.—*Huyshe*, p. 44.

It is necessary that the definition should convey a clearer idea than the definitum, otherwise it would not explain it; and it is one of the objects of definition to explain a term implying a complex conception by other terms implying less complex conceptions, or, at all events, better known.

The following examples offend against this rule :—

Net-work, anything reticulated or decussated with interstices between the points of intersection.[a]

Species is the identity of determinate form, cardinal properties, and organific or constitutive law.[b]

3. The definition must be included in a just number of proper words.[c]

By *proper words* (*voces propriæ*) Aldrich means words sanctioned by common usage,[d] in contradistinction to metaphorical and obsolete phraseology. The terms which compose the following definitions are metaphorical :—

Old age is the evening of life.

A *warrior* is a thunderbolt of war.

The following examples are characterised by undue brevity :—

A *chariot* is a vehicle.

A *cascade* is a waterfall.

Money is coin.[e]

[a] Johnson. [b] Tappan.

[c] Nam ex Metaphoris oritur ambiguitas, ex prolixitate, confusio—for from *metaphorical* terms there would rise indistinctness or ambiguity, from undue *brevity* obscurity, and from too great *prolixity* confusion.—*Aldrich.* παν γαρ ασαφες το κατα μεταφοραν λεγομενον, παν γαρ ασαφες το μη ειωθος —for everything is deficient in precision and clearness which is spoken metaphorically, or in language not sanctioned by common usage.—*Artistotle.*

[d] κυρια ονοματα, otherwise called established names (κειμενα ονοματα). —*Aristotle.*

[e] These instances exemplify what is called by some, definition from change of *symbol*, where both subject and predicate are symbolical conceptions—the latter being given as a substitute for the former on a principle of expedience only.—See *Outline of the Laws of Thought*, p. 160.

The subjoined examples, on the other hand, are vitiated by unnecessary prolixity:—

Astrology is that curious science, so much in vogue during the middle ages, which instructs mankind in the supposed influences which the stars possess over human circumstances and actions, and by which they rule and direct the world.

Money is that useful species of property which, by serving as a common measure, by which all the necessaries, all the conveniences, and all the luxuries of life may be estimated and procured, becomes itself the great essential, and comprises within itself all that can be thought needful to render life desirable.[a]

Aristotle's view of definition is threefold. 1. The definition of a thing as it is in itself (λογος του τι εστι), corresponding to the Real Definition of more recent logicians. This kind of definition is first applied to substances which exist *per se;* and as their existence is *assumed*, not demonstrated, their definition is said to be unsusceptible of demonstration (αναποδεικτος). 2. The definition of an attribute. This is also a definition (του τι εστι), with this difference, that the existence of an attribute is not assumed, but demonstrated to exist in the substance, or subject of inhesion, and the demonstration consequently proceeds on the assumption of the existence of the subject: in other words, the cause of the attribute is sought in the subject. This is illustrated by defining an eclipse.—Why is the moon eclipsed? Because the sun's light is intercepted by the earth. Consequently, to the question, What is an eclipse of the moon? the answer (i. e., the definition) will be,

[a] If a definition be chargeable with tautology, it is incorrect, though without offending against the two rules. Tautology consists in inserting too much, not in mere words, but in sense. Thus to define a parallelogram, a 'four-sided figure, whose opposite sides are parallel and *equal*,' would be tautological, because though it is true that such a figure, and such alone, is a parallelogram, the equality of the sides is implied in their being parallel, and may be proved from it.—*Whateley*, book II., cap. 5.

The interception of the sun's light from the moon by the earth. This demonstration is capable of being reduced to syllogistic[a] form; but as it stands, it differs from demonstration, as stated by Aristotle himself, in the arrangement or position of the terms (θεσις), or grammatical variety of form (πτωσις). 3. Nominal definition, or, according to others, imperfect Real Definition. Aristotle's explanation of it is, της του τι εστιν αποδειξεως συμπερασμα—the conclusion of the demonstration of what a thing is. As Aristotle objects to nominal definition, on the ground that it furnishes no proof of the actual existence of the things to which it applies, and as in many cases the nominal and real definition of a thing may nearly or altogether coincide, the latter opinion, viz., that of imperfect real definition is here considered to be meant by him. His views on the whole doctrine of definition are, however, obscure.

SECTION VII.

OF THE DISTRIBUTION OF TERMS.

The subject (ὑποκειμενον) is distributed in all universal propositions, and the predicate in all negative propositions, since in the former the *entire* conception is included, while in the latter the *entire* conception is excluded. In considering terms with reference to their distribution, there are two rules which it will be necessary to remember:—

1. All universal propositions (and no particular) distribute the subject.

2. All negative propositions (and no affirmative) distribute the predicate.

When we say that a term is distributed, we mean that it is

[a] Omne corpus naturale illuminatum a sole, privatum luce a terrae objectu deficit; luna est hujusmodi, ergo luna deficit.—*Aquinas.*

used in its fullest extent; that it stands for all its significates, viz., the several things which it signifies or to which it is applicable.

1. *Of the Subject.*

In all universal propositions, whether affirmative or negative, the subject must be distributed; for this is the differentia of a universal proposition viewed as to its quantity. In the proposition,

All tyrants are miserable,

the common term 'tyrants' includes Dionysius, Phraates, Nero, and every other individual answering to the description; in other words, it stands for the whole of its significates. When, again, we say,

No islands are surrounded by water,

everything of which the common term 'island' can be affirmed is excluded from the application of the predicate 'surrounded by water;' in other words, none of the significates of the term 'island' agrees with the predicate.

Since the distribution of the terms of propositions is indicated by the universality of the subject or the negative character of the proposition, it is manifest that in all particular propositions the subject is *undistributed*,[a] as it stands only for a part of its significates, being restricted to this either by its indefinite character or some qualifying term. In the example,

Some islands are fertile,

the term 'island,' though applicable in its unrestricted sense to Iceland, and all barren islands, yet, as used in this proposition, it does not embrace these among its significates, as it only contains in its extension such islands as may be affirmed to be fertile; and hence it is not distributed. In the example,

[a] Where we represent, judge of, or reason from a whole conception, it is said in technical language to be *distributed;* where a part only is treated, we call it *undistributed.*—*Outline of the Laws of Thought*, p. 138.

Some critics are not candid judges,

the subject 'critics' is also used in a restricted sense, for it excludes from its extension all such critics as are *candid* judges.

It is evident, therefore, that the distribution or non-distribution of a term depends on its *quantity*, and not on its *quality*.

It follows from the foregoing, that the subject of an indefinite proposition, in *necessary* matter, is distributed. In the example,

Angels are incorporeal,

although there is no sign of universality prefixed to the subject, yet, as it is in necessary matter, we are warranted to affirm the predicate of *all* angels.

The subject of an indefinite proposition, in *contingent* matter, on the other hand, is undistributed. In the example,

Misfortunes are unavoidable,

we know from the matter that the subject must be taken in a restricted sense, and that all we can affirm is *some* misfortunes, &c.

2. *Of the Predicate.*

The predicate (κατηγορουμενον) of an affirmative proposition, with few exceptions, is never distributed. In the following example of a universal affirmative, viz.,

All metals are fusible,

the predicate 'fusible' is not distributed; for although it is affirmed of *all metals*, this does not exhaust its application, inasmuch as it is predicable of many other substances besides metals, and, consequently, it cannot be said to be wholly distributed, since the *subject* of the proposition does not express all the substances capable of being fused.

This is still more obvious in the case of a particular affirmative, e. g.,

Some vapours are luminous.

Here the predicate 'luminous' is predicable not only of some vapours, but of an indefinite variety of bodies.

It happens occasionally that the perdicate is of equal extent with the subject, i. e., that the predicate fully distributed may be affirmed of the subject also fully distributed. The judgments expressed in propositions of this nature are said to be *substitutive;* for since in them the predicate is used to define the subject, the whole of it must be given, otherwise it would be useless for definition. The subject and predicate are therefore exactly co-extensive, for they may change places in the judgment, so that the definitum may in its turn become a definition, e. g., in the example, 'Man is a rational animal,' no individual comes into the class of *rational animals* which is not also in *man;* and, conversely, no individual comes under man which is not also under rational animal; for here both the subject and predicate are generalisations from the very same class of beings—the only difference being that the subject is symbolical, or the sign of a class, while the predicate is notative, that is, noting essential attributes.

It is only in definitions that the subject and predicate are co-extensive, and this coincidence occurs wherever the predicate is a definition of the subject; as,

Rhetoric is the art of speaking persuasively.

Or its logical difference; as,

All men are rational.

A proposition is a declaratory sentence.

Or a specific property; as,

A triangle is a figure having three angles.

A proposition is a sentence signifying something true or false.

Or in any case, in short, where the subject and predicate are simply convertible.

In these examples the predicate may, in its distributed sense, be affirmed of the subject; but it is to be observed that this circumstance cannot be inferred from the mere form of the proposition. It follows from the *matter*, not from the terms of the expression.

The judgment expressed by any proposition in which the subject and predicate are not co-extensive, is said to be *attributive*, as the predicate merely expresses an attribute not simply convertible with the subject, and cannot therefore be used to define the subject, e. g.,

Metals are fusible,

Gold is heavy,

are judgments in which this kind of predicate occurs.

In negative propositions, whether universal or particular, the predicate must be distributed, otherwise the proposition could not be true, e. g., the proposition,

Irrational animals are not morally responsible,

would be false if any part of the predicate, 'morally responsible,' agreed with the subject, 'irrational animals.'

In particular negatives, however, the distribution of the predicate is not so evident, e. g., the proposition,

Some critics are not candid,

asserts that there is a certain class of critics comprised in the subject, from which *every* individual of which the predicate can be affirmed is wholly excluded; in other words, the predicate 'candid,' in its most extensive signification, cannot be affirmed of *any* individual comprised under the particular class of critics denoted by the subject. Consequently, the predicate is used here in its universal, i. e., its *distributed* sense, and unless it were so, the proposition would not be true.

No signs of universality or particularity are prefixed to the predicate, because in affirmative propositions its non-distribution is indicated by the *affirmation*, and in negative propositions its distribution is indicated by the *negation*.

It has been shown above that a term may consist of one word, or several; but the only terms consisting of one word, which can be used as the subjects or predicates of propositions, are nouns substantive in the nominative case. We may add here that the infinitive of a verb, a certain form of which is only one word, may also be used as a term in a proposition,

being equivalent to a noun-substantive. In English, in addition to the usual form of the infinitive, which may be used as a term in a proposition, there is another, ending in '*ing*,' synonymous with the ordinary form, e. g., 'Instructing the ignorant is praiseworthy,' and 'It is praiseworthy to instruct the ignorant,' are equivalent propositions.

This kind of infinitive is of the same form and sound as the participle present, but it can always be distinguished from it in this way, viz., when the usual form of the infinitive can be substituted for it without injuring the sense, it is the infinitive in '*ing;*' but when this substitution cannot take place without injuring the sense, then it is the participle present.

The infinitive in 'ing' may be used as a categorem, i. e., as a word having enough of independent meaning in itself to constitute a term, as,

Seeing is believing;

or it may be used as a syncategorem, i. e., as constituting a term in connection with other words, e. g.,

Accuracy in observing individual facts is necessary to correct induction.

It may be remarked, that the infinitive is often the predicate of a proposition; but this never happens except when another infinitive is the subject, e. g.,

To imitate, is to admire.

To bear, is to conquer our fate.

To be loved, is to be happy.

Laborare est orare.

It may be remarked, that neither the infinitive, which is properly a noun-substantive, nor the participle, which is a noun-adjective, is included under the word 'verb,' for strictly speaking they are verbals, i. e., they have a relation to their verbs in signification, but they differ from them in the *mode* of signification. This arises from the circumstance that *affirmation*, which is essential to a verb, is not an attribute either of an infinitive or a participle.

CHAPTER III.

SECTION I.

JUDGMENT.

HAVING already considered the first head of the logical distribution of the cognitive faculties, viz., Simple Apprehension, and having treated of notions as simple or complex, of terms as singular or common, together with their names and classifications, as well as the logical instruments whereby we acquire distinctness in the apprehension of the meaning and use of terms, we now proceed to the second head, viz., *Judgment.*

Under this head, we consider the mind not only as possessing notions distinctly, but as capable of comparing them together, and of asserting some relation between them, whether of agreement or disagreement. While such assertion remains purely a mental act, it is called a *judgment;* but when it is expressed in words, it is termed a *proposition.*

OF SIMPLE PROPOSITIONS.

A proposition is defined by Aldrich to be '*Oratio indicativa*[a] *congrua et perfecta verum vel falsum significans sine ambiguitate*,'—an asserting sentence grammatical and perfect, signifying something true or false, and free from ambiguity. This definition is of a mixed nature. It is partly metaphysical, and partly accidental. It is metaphysical, in so far as

[a] λογος αποφαντικος.—*Aristotle.* Oratio enunciativa.—*Boethius.*

it defines a proposition to be an *asserting sentence* (oratio indicativa); but it is accidental, in so far as it states it to be *true* or *false*—and accidents should be excluded from the definition of what is implied by a common term.

This objection to the definition of Aldrich may be removed by restricting the definition to the two first words, 'oratio indicativa,' an *asserting sentence;* for a proposition, logically defined, is a sentence which asserts, i. e., *affirms* or *denies.* This latter definition will consequently comprehend the whole essence of a proposition; for a *sentence* is its *genus*, and *asserting*, i. e., *affirming* or *denying*, its *difference.*

Since, therefore, a proposition must assert, i. e., affirm or deny some thing, all *exclamations*, *interrogations*, *requests*, and *commands*, &c., as no assertion is made in them, must be excluded; as, for example,

Oh! how amiable are thy dwellings!

Do ye now believe?

Give me thy heart.

Love thy neighbour as thyself.

In a legitimate proposition, the four following conditions are requisite:—

1. With regard to the words, it must be a sentence which affirms or denies; as,

All beasts of prey are carnivorous.

The earth is not a plane.

2. In respect of signification, it must signify something true; as,

The air is elastic;

or false; as,

Moonlight is cold.

3. A proposition must not be ambiguous; in other words, it must not admit of dubious construction; for if it did, it would be more than *one sentence*, and instead of being 'oratio indicativa,' an 'asserting sentence,' it would be 'orationes indicativæ,' 'asserting sentences.'

Any proposition of an ambiguous nature, i. e., capable of being construed in more ways than one, must be a double sentence; and this ambiguity is usually produced by equivocal words; as,

That is a bull.

That is a bar.

For the predicate in each of these propositions may be used equivocally.

4. A proposition must not be ungrammatical; for in this case it might be unintelligible. In proverbs, and elliptical sentences, the meaning may be intelligible, while the proposition itself cannot be strictly termed complete, e. g.,

A word to the wise,

as a proposition, is incomplete in form, but not in sense. The same ellipsis is adopted in the Latin—

Verbum sat sapienti.

The corresponding French proverb—

Le sage entend a demi-mot,

is complete in form as well as in sense.

Division of Propositions.

Propositions are divided according to their *substance*,[a] their *quality*, and their *quantity*.

1. *Of the substance of Propositions.*

With regard to their substance, propositions are of two kinds, viz., *categorical*[b] and *hypothetical*.

[a] *Relation*, quality, quantity.—*Kant.*

[b] The division of propositions into categorical and hypothetical, is not Aristotelian. In every instance in which κατηγορικος occurs in the organon of Aristotle, it signifies *affirmative*, and is used by him not as opposed to *hypothetical* (εξ ὑποθεσεως), but to the words αποφατικος and στερητικος, which signify *negation* or *privation*. The meaning usually attached to 'categorical,' viz., an unconditional assertion, whether affirmative or negative, is supposed to have originated with Theophrastus, and is therefore not of Aristotelian origin.—

1. *Categorical Propositions.*—A categorical proposition asserts absolutely, i. e., unconditionally; as,

Music is the elocution of poetry.
Honesty is the best policy.
Man is not omniscient.

Categorical propositions are of two kinds, viz., *pure* and *modal*.

A pure categorical proposition simply asserts whether the subject does or does not agree with the predicate; as,

Virtue is its own reward.
Benevolence is not the whole of virtue.
Man is not infallible.

A pure categorical proposition is sometimes called *propositio de inesse*, because it simply states whether the predicate is or is not (metaphysically) in the subject. A *modal* categorical proposition expresses in what *mode* or manner the subject *does* or *does not* agree with the predicate; as,

This man may *perhaps* be religious.
No man can be *altogether* disinterested.
A prejudiced historian will *probably* misrepresent the truth.

The modality of a proposition affects the copula.

Modal propositions may be reduced to pure categoricals by either considering the word which expresses the mode as united to the predicate, and thus forming a part of it; as,

Man is necessarily an animal;

or sometimes by attaching the word denoting the mode to the subject, which may be done when the *mode* only expresses whether the matter of the extremes be *necessary*, *impossible*, or *contingent*; as,

A fish lives necessarily in the water;

which means,

[See *Ed. Rev.*, vol. 57.] The division of propositions, however, into categorical and hypothetical, can scarcely be considered a cross one; for all assertions must be made either *with* or *without* a condition.

All fish live in the water.

A profligate man may possibly repent, and be saved; which may be thus stated—

The repentance and salvation of a profligate man is a thing that is possible.[a]

Modal propositions will be more fully treated of hereafter, and in a different point of view.

2. *Of the Quality of Propositions.*

The quality of a proposition is of two kinds, *essential* and *accidental.*

The quality of the *expression* of a proposition constitutes its *essential* quality; because affirmation or negation forms the logical difference or formal part of the essence, and is the only differentia from which all the propria may be deduced.

The quality of the *sense* is the *accidental* quality; because the expression of truth and of falsehood is the *property*, and, consequently, only an adjunct to the essence.

When the term quality is used concerning propositions, without any distinguishing epithet, the essential quality is signified.

The *essential* quality of a proposition is determined by the copula; and hence it must be carefully observed, when a sign of negation occurs in a proposition, whether it really affects the copula. This may be done in any case, by analysing the proposition, and making allowance for the idiom of the language in which it is expressed. In a strictly logical point of view, the negative particle is always considered to affect the copula in whatever part of a proposition the idiom of any particular language may place it; and for this reason, propositions

[a] Between the modality and matter of a proposition, logicians have made this distinction: Modality is an affection of the copula, and depends on the assertion; Matter is an affection of the terms, and depends not on the assertion, but on the actual relation of the things spoken of. In Aristotle's view, however, the modality of a proposition is to be looked for rather in the matter than in the enunciation.

virtually negative, although not so apparently, may, by logical resolution, be reduced to a proper negative form, e. g.,

No brutes are morally responsible,

may be resolved into

Brutes are not morally responsible.

On a similar principle, negative propositions may be reduced to an affirmative form, by changing the place of the negative sign, and uniting it either with the subject or predicate, e. g.,

Minds are not material,

may become affirmative by uniting the negative particle with the predicate, thus—

Minds are, not-material;

and by another change of phrase, the same conception may be thus expressed—

Minds are immaterial.

Propositions which thus vary both in form and phraseology, but in which the same conceptions are virtually expressed, are designated *equipollent* propositions.

According to their *essential* quality, propositions are divided into *affirmative* and *negative*.

1. An *affirmative*[a] proposition is one which asserts that its extremes, viz., its subject and predicate, agree with each other; in other words, that the predicate may be affirmed of the subject; as,

All true Christians are lovers of God.

The English are the sovereigns of the ocean.

Errors are marks of human infirmity.

All philosophers profess to aim at the discovery of truth.

2. A *negative*[b] proposition is that which asserts that its extremes *disagree;* in other words, that the predicate cannot be affirmed of the subject; as,

[a] καταφασις εστιν αποφανσις τινος κατα τινος.—*Aristotle.*

[b] Αποφασις εστιν αποφανσις τινος απο τινος.—*Idem.*

No miser is happy.

All the troops united, were not able to defend the fortress.

A modest man cannot allege his own merits.

A proposition is not negative, unless the particle of negation immediately affects the copula. The following propositions are therefore affirmative:—

He who is not dishonest deserves our esteem.

The man who sinneth not, is blessed indeed.

Non injussa cano—I sing things not uncommanded.

In English two negatives, connected in one sentence, make an affirmative; as,

No man is *not* mortal;

which is the same in meaning with *man is mortal.* But in Greek, and often in French, two negatives render the negation intensive.

According to their accidental quality, propositions are divided into *true* and *false.* This is said to be the proprium, inasmuch as it results from the essence of the proposition, i. e., *from the difference or assertion.*

A *true* proposition is that which asserts what is the fact; as,

Every good man is virtuous.

All islands are surrounded by water.

A *false* proposition is that which asserts what *is not* the fact; as,

A thief is trustworthy.

All the planets are stationary.

Truth is either *logical* or *ethical.*

A proposition is *logically* true, when the relation predicated between a subject and a predicate actually exists.

A proposition is *ethically* true, when its enunciation agrees with the judgment of the mind. If I say,

This chiffonier is made of mahogany,

and believe it to be so, the proposition is *ethically* true; but

if it be merely veneered, the proposition is *logically* false. If the mind judge aright concerning things, the same propositions will be both logically and ethically true. If the mind judge not aright, the proposition that is ethically true will be logically false, and the proposition that is logically true will be ethically false.

3. *Of the Quantity of Propositions.*

The *quantity* of a proposition means *the extent* to which the predicate is asserted of the subject.

According to their quantity, propositions may be divided into *universal*, *particular*, *singular*, and *indefinite*.[a]

1. A universal affirmative proposition is that in which the predicate is affirmed of the whole of the subject; and in this case the subject is taken in its whole sense, i. e., for everything signified by it, and is therefore said to be *distributed*.

A term, whether used as a subject or predicate, is *distributed* or *universal*, when used in its widest signification, as being applied without limitation to every individual signified by it.

Such distribution is indicated by some sign of universality, as *all*, *every*, *whatever*, &c., e. g.,—

All the metals are fusible by heat.

All animals have the power of motion.

Every intelligent being is responsible for his conduct.

Whatever is produced by regular laws, is a proof of an intelligent agent.

2. An universal negative is a proposition whose subject is an universal term of the whole of which the predicate is denied. Its usual signs are *no*, *none*, *neither*, &c., e. g.,—

No conscientious person is deserving of ridicule.

No human foresight can check the advance of old age, infirmities, and death.

[a] Instead of *indefinite*, Sir W. Hamilton recommends *indesignate*.

None of the ancient philosophers understood fluxions.
Neither of the Bernoullis proved the case against Newton.

The universality of a proposition is of two kinds, *metaphysical* and *moral.*

A proposition metaphysically *universal* is that in which the predicate agrees with all the individuals contained in the subject, without exception; as,

Every man is an animal.
All circles have a centre and circumference.
All spirits are in their nature immortal.

In each of these examples the predicate agrees with all the individuals of the subject, and we may therefore legitimately deduce from any of them either a particular proposition; as, for example,

Some men are animals;

or a singular proposition; as,

John is an animal.

A proposition *morally universal* is that in which the predicate agrees with most of the individuals of the subject, but not with all; e. g.—

All men prefer their own interest to the public.

In this example the predicate, in its agreement with the individuals of the subject, admits of some exceptions. From this proposition, therefore, we may deduce a particular proposition; as,

Some men prefer their own interests to the public;

but not a singular; as,

Aristides prefers his own interest to the public;

for the singular subject 'Aristides' may be among the individuals with which the predicate does not agree (vide Subalternation of propositions).

3. A *particular* affirmative proposition is that whose subject is a universal term, with a particular sign prefixed, and of a part of which only the predicate is affirmed. The usual signs are *some*, *many*, *most*, *few*, *several*, *there are*, &c., e. g.—

Some men of deep erudition confine their knowledge to their own breasts.
Many men have raised fortunes, at the hazard of their lives.
Most arbitrary monarchs are revengeful.
Few men are truly wise.
Several animals are amphibious.
There are metals which are lighter than water.

A *particular negative* proposition is that whose subject is a universal term, with a particular sign prefixed, and of a part of which only the predicate is denied. The usual signs are those of a *particular affirmative* with the particle *not* annexed to the copula, e. g.—

Some offenders are not duly punished.
Many authors are not men of original genius.
Several troops were not armed.
There are creatures which are not responsible.

The subject of a negative proposition may have a universal sign, and yet the proposition may be equivalent only to a particular negative. In the following propositions, for example,—

All men have not faith,
All is not gold that glitters,

the logical order should be,

Not all men have faith.
Not everything which glitters is gold.

Hence they are equivalent only to—

Some men have not faith.
Some things which glitter are not gold.

There are some *particular signs* which make a near approach to a universal affirmative; as, *almost all, by far the greater part*, &c., e. g.—

Almost all the poets have been unfortunate.
By far the greater part of men prefer private interest to that of the public.

Some particular signs, on the other hand, render a proposition almost equivalent to a universal negative; as, *few*, &c., e. g.—

Few men, in this period of universal knowledge, attain to literary eminence.
There are scarcely any who are free from the influence of some prejudices.

4. A *singular* proposition is one whose subject is (1) either a *singular* term—as,

Napoleon was a brave man;
Des Cartes was an ingenious philosopher;
Sir Isaac Newton was the author of the Principia;
Noah's ark contained animals of every species;

or (2) a singular pronoun; as,

Thou art the man;
Non omnis moriar,—I shall not altogether die;

or (3) a common term, with a singular sign, i. e., a universal in the form of an individual—

This fable is instructive;

That general was defeated;
This man is occasionally intemperate;

or (4) when the subject consists of a number of nouns *collectively* understood; so that they may be viewed as one *single thing* or *body;* as,

Cæsar, Pompey, and Crassus constituted the first triumvirate.
All the books in Ptolemy's library consisted of 200,000 volumes, i. e., all together.
The king, lords, and commons form a British parliament.

The syncategorem *all*, when used *distributively*, is a sign of a *universal proposition;* when it is applied in a *collective* sense, the proposition is *singular;* when it is *distributive*, its place may be correctly supplied by *every* or *each;* as,

All the colleges are governed by their respective statutes, i. e., each of the colleges.
All the primary planets revolve in elliptic orbits about our sun as their centre.

When it is *collective*, it admits of the introduction of the word *together;* as,

All the colleges constitute an university, i. e., collectively taken.
All the primary planets are eleven.

In all singular propositions the predicate is asserted of the whole of the subject. Hence the subject is distributed, and singular propositions are considered as universals.

5. An *indefinite* proposition has a common term for its subject; but it has no sign expressed to indicate whether its subject is to be taken in a *universal* or *particular* sense; as,

Beasts have four feet, i. e., all beasts.
A planet is ever changing its place, i. e., all planets.

The stars appear to us when the twilight is gone, i. e., those stars only which are above the horizon.

Every indefinite proposition will admit either of an universal or a particular sign, for the predicate must be asserted either *universally* or *partially* of the subject. But to determine this, we must look to the *matter* of the proposition, as it is in this way alone we can ascertain the natural connection between the subject and the predicate. The matter[a] of a proposition is the extent of connection which naturally exists between the extremes, and it is of three kinds—*necessary*, *impossible*, and *contingent*.

When the terms of a proposition agree essentially and invariably with each other, it is said to be in *necessary*[b] matter, e. g.—

All moral agents are responsible.

[a] Those who hold logic to be a formal science must of course discard from its domain all consideration of real existence, and of the relations of real existence. Of the truth or falsehood of propositions in themselves, it is supposed to know nothing, and can take no account of it. If this view of logic be correct, the *matter* and *modality* of propositions must be excluded from its province as extra-logical. 'If truth or falsehood,' remarks Sir W. Hamilton, 'as a material quality of propositions and syllogisms is extralogical, so also is their modality. Necessity, possibility, &c., are circumstances which do not affect the logical copula or the logical inference. They do not relate to the connection of the subject and the predicate, of the antecedent and consequent, as terms in thought, but as realities in existence; they are metaphysical, not logical conditions. The syllogistic inference is always necessary; it is modified by no extraformal condition; is equally apodictic in contingent as in necessary matter.'—*Ed. Rev.*, Vol. LVII.

Kant sanctions the modality of propositions and syllogisms as necessary to be taken into account by the logician. Whateley's views of the province of logic are so contradictory that his authority on either side of the question goes for nothing.

[b] There are three ways in which a predicate may be conceived of as necessary to its subject:—First, if it is an essential or formal quality—this is formal necessity;—secondly, as being an inseparable deduction from some essential or

When the terms of a proposition differ from each other essentially and invariably, it is said to be in *impossible* matter, e. g.—

No triangles are squares.

When the terms of a proposition partly agree with each other, and partly differ, it is said to be in *contingent* matter, e. g.—

Legal enactments are beneficial to society.

Of propositions implying necessary matter, affirmatives are true, and negatives false; of those expressing impossible matter, negatives are true, and affirmatives false; of those expressing contingent matter, universals are false and particulars true.

In *necessary* and *impossible* matter indefinite propositions are reduced to the class of universals, and in *contingent* matter to the class of particulars. In the following example,

Angels are incorporeal,

the subject *angels* is not accompanied by any sign of universality or particularity; but as we cannot conceive of 'angels' as not being incorporeal, we affirm this predicate of all angels; and hence the proposition is universal, the predicate being asserted of the *whole* subject. In the following proposition,

Human inventions are beneficial to society,

there is no sign indicative either of universal or particular quantity prefixed to the subject; but on examining the mat-

formal quality—this is natural necessity;—thirdly, as being incapable of being denied to it henceforward—this is necessity of fact. The first necessity is expressed, when we say that a quality is generic or specific—the second, when we call it a proprium—the third, when we say that a fact has become an inseparable accident.—*Moberly*, p. 30.

ter of the proposition, we ascertain that the predicate cannot be affirmed of the whole subject, because the matter of the proposition is contingent; and hence we can only assert,

Some human inventions are beneficial to society.

Since *singular* propositions may be considered as universals, and since *indefinite* propositions can be reduced to universals, if their matter is *necessary* or *impossible*, and to *particulars*, if their matter is *contingent*, it is unnecessary to consider either as a separate class of propositions; for, strictly speaking, propositions, when viewed according to their quantity, may be divided into two kinds, viz., universal and particular.

All pure categorical propositions, therefore, considered according to their quality and quantity, may be regarded as of four kinds, viz., universal affirmative, universal negative, particular affirmative, and particular negative. These four classes of propositions are marked by the first four vowels, called symbols. Thus—

A. Universal affirmative.
E. Universal negative.
I. Particular affirmative.
O. Particular negative.

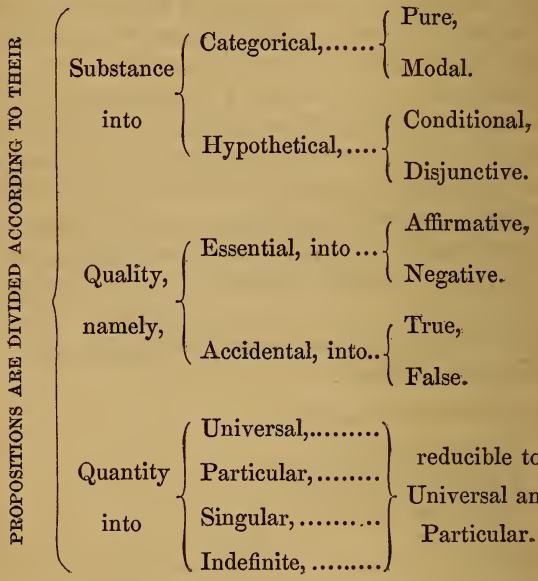
The following scheme exhibits the relations of quantity and quality:—

PROPOSITIONS.	SUBJECTS.	PREDICATES.
Universal affirmatives,	Universal,	Particular.
Universal negatives,	Universal,	Universal.
Particular affirmatives,	Particular,	Particular.
Particular negatives,	Particular,	Universal.

In reference to the universality and particularity of the predicates of propositions, the following maxims will be found in all cases to apply:—In negative propositions the predicate is universal by *necessity*. In affirmative propositions the pre-

dicate is particular when it is only an attribute of the subject; but it is universal when it can be substituted for, or reciprocate with the subject.

The following scheme presents the division of propositions, with their sub-divisions :—



SECTION II.

OF THE MODALITY OF PROPOSITIONS.

Modal propositions have been already cursorily noticed in the manner in which they are generally treated, viz., that of considering any proposition to be modal in which the copula is affected by some modifying word, e. g.—

Men are necessarily mortal.

A modal proposition of this description consists of what is termed the *dictum* and the *modus*. The dictum is the subject, and the modus the predicate. In the examples given already, there is no difficulty in distinguishing the subject from the predicate, for they stand in their legitimate order, while the nature of their relation is determined by the word qualifying the copula; and the relation may be either that of necessity, possibility, impossibility, or contingency. But propositions often occur, usually considered modal, in which it is often requisite to alter the arrangement of the words in which they are expressed, in order to see clearly which is the dictum, and which the modus. In such cases, it is necessary first to ascertain the term, or the particular number of words constituting a term, which represents the dictum; and when this is ascertained, all that remains is, to connect the term constituting the modus with the copula,—for the modus must be always joined to the copula,—and what is so joined is the predicate. In the following proposition, viz.,

It is necessary that a man should be an animal,

there is a necessity of agreement asserted between the subject and predicate, and on examining the proposition, we find 'that a man should be an animal' is the dictum or subject, and 'necessary' the modus or predicate. By uniting the modus with the copula, the proposition will stand thus:

That a man should be an animal is necessary.

It is evident that the first kind of modal propositions mentioned, (viz., those in which the subject and predicate occupy their legitimate places) may be multiplied to any extent; for any adverb affecting the copula, and thereby qualifying the predicate, or even an adjective qualifying the subject, is sufficient to rank the proposition in which it occurs in this class of modals. It may be remarked, however, that this indefinite multiplication of modals is not to be attributed to Aristotle;

it originated with his Greek commentators, and was followed out by subsequent logicians. On the other hand, the various forms under which modal propositions of the latter description appear, although, as well as the former, easily reducible to the categorical form, will, if they are to be resolved into the dictum and modus, which they easily may be, constitute a second class of modals equally numerous. If, however, modality is to be restricted to one or both of these classes (and it would appear that these are the only kinds of it recognisable in *pure* logic, as they necessitate, under certain conditions, a corresponding modification of their immediate or mediate consequents), a little consideration will suffice to show, that the propositions falling under either of the classes should be designated propositions *verbally modal*—their modality being *expressed*, not *implied;* for in all cases, by a slight alteration in the phraseology, or a different arrangement of the order of the terms, they may be reduced to pure categorical propositions.

Whether modality, either *expressed* or *implied* in a proposition, should be relegated from the domain of pure logic, is a question among logicians. Some, holding the formal view, admit the *expressed*, but reject the *implied;* while others exclude both. No sufficient reason has been shown, however, why expressed modality should be banished from pure logic; for if a premiss is assumed under a necessity, or probability, or possibility, of being true, any of these conditions will, in a corresponding degree, determine the conclusion to be deduced, which, under any of these assumptions will be as purely logical as that the truth of the conclusion follows from the truth of the premisses, or the falsity of the conclusion from the falsity of the premisses.

In applied logic, on the other hand, there seems no reason why *implied* modality should not be recognised; and hence the modality of a proposition would depend, in many cases, not on the effect a qualifying epithet may have on the copula,

but on the degree of certainty a thinker may entertain regarding a judgment, and in contradistinction to *verbal modality*, it might be very properly designated *material modality*. Aristotle, whose view of modality may be, with some straining, interpreted either as *expressed* or *understood* in a proposition, enumerates four *modes*, viz., the *necessary* (αναγκαιον), the *impossible* (αδυνατον), the *contingent* (ενδεχομενον), and the *possible* (δυνατον). Whether he added the *true* (αληθες) and the *false* (ουκ αληθες) is not quite clear. From his classification of judgments, however, and the grounds on which they must be explained, it may be presumed that he would not exclude implied modality from applied logic. In this view, therefore, the modality of a judgment in applied logic may depend on our knowledge of facts and things, or the degree of certainty with which we can assert the agreement or disagreement of any given subject and predicate. Hence the modality of our judgments will vary with the increase of our knowledge, and what is problematical at one time may amount to belief at another. The objective facts and things concerning which we judge remain the same, whatever changes may take place in the mind of the thinker as to clearer apprehensions of them. The change is subjective, not objective.

On examining Aristotle's four modes, it will appear that all possible judgments may be reduced to three classes, viz., the

Problematical,
Assertory, and
Demonstrable.

This is Aristotle's distribution. All judgments which are merely matters of *opinion* come under the class 'problematical;' all judgments founded on *belief* may be referred to the class 'assertory;' while all judgments resulting from the *axioms* and *deductions of pure science* belong to the class 'demonstrable.'

Of the three, the *problematical* judgment is obviously the weakest, for it is neither regarded as true by the thinker, nor can it be shown to be a true decision in reference to the object or thing concerning which the judgment is made. Consequently, it cannot be laid down as truth either in a subjective or objective sense. In illustration, let us take the following example:—

The solar system may be a gradual projection from the sun.

In this judgment, there may be either a total, partial, or no agreement between the subject and predicate; but from our imperfect knowledge of the object-matter of the judgment, we can only affirm a possible dependence or agreement between them. The judgment may indeed be true, and farther knowledge may prove it so, but now it is merely matter of opinion.

All judgments which rest on *possibility* or *probability*, or to which *doubt* attaches in the mind of the thinking subject, may be classed under problematical judgments.

The learner should observe, that in propositions the words 'may be' often occur in two different senses. In the proposition, The world may be circumnavigated, 'may be' means *is capable of being*, and the proposition is assertory; while in the proposition, All the species in the world may be the offspring of a few primary species, 'may be' means *are*, *for anything we know*, and the proposition is problematical.

An *assertory* judgment implies *belief* in addition to opinion, and is therefore subjectively true, i. e., held as true by the thinker. An assertory judgment may also be true with respect to the fact or object regarding which it is made, but its truth objectively is indemonstrable. An assertory judgment is therefore subjectively *true*, but not objectively *certain*. The following is an example of an assertory judgment:—

A mixed monarchy is the best form of government;

and to a person holding this opinion as *belief*, the judgment is subjectively true, inasmuch as the thinking subject believes it to be so. Objectively, however, it is not certain, for one may believe the democratic, a second the despotic, and a third the patriarchal, to be the best form of government. An assertory differs from a demonstrable judgment in this, that however firm our own belief may be in the truth of an assertory judgment, we cannot *compel* men in general to acquiesce in it, because however strong the evidence in its favour may be, it cannot amount to absolute demonstration.

Belief in the truth of an assertory judgment may be confined to one thinking subject, because he may have examined the object-matter of it more carefully and minutely than other thinking subjects, or he may have been influenced by prejudice, interest, or any other adequate cause.

Belief in the truth of an assertory judgment may be common to any particular sect or school, e. g., Calvinists may believe in common that Calvin's Institutes are the best compend of Theology. The same holds true in the case of political classes, or in philosophical schools, &c. This coincidence of belief may arise from similarity in habits of thought, or from educational training, or any cause sufficient to present a judgment to the mind of the thinking subject as true.

Belief in the truth of an assertory judgment may be common to all, e. g., That there is a First Cause; That there is a day of final retribution; That there is a future state; are matters to which universal belief is acceded, although not susceptible of absolute demonstration.

In every case, the truth of an assertory proposition, whether held by an individual, or a class, or men in general, depends on *moral* not on demonstrable certainty.

Belief in the truth of a demonstrable judgment occupies the highest place in the scale of credibility. It is not only subjectively, but also objectively true, and differs, consequently, both from the problematical and assertory judgment.

A demonstrable judgment is self-evident, as in mathematical axioms, e. g.—

If equals be added to equals, the wholes are equal.

Things which are equal to the same thing are equal to one another.

Or it may be a deduction from self-evident principles; as,

The circumference of a circle is thrice its diameter.

The angles at the base of an isosceles triangle are equal.

SECTION III.

THE OPPOSITION OF PROPOSITIONS.

Propositions have hitherto been treated in their absolute character, we now proceed to consider them in their *relative* character or affections. The relative affections of propositions are of three kinds, viz., *subalternation*, *conversion*, and *opposition*. A knowledge of these is subservient to the doctrine of syllogisms; for by subalternation we infer several conclusions from the same premisses; by opposition we reduce imperfect moods to perfect, while conversion aids in both.

1. *Subalternation.*

Subalternation is the deduction of a particular or singular proposition from a universal,—both, namely, the premiss and deduction, having the same subject and the same predicate. Subalternation is either between A. and I. or E. and O.

The two propositions compared together are—the one a universal proposition, called the *subalternans;* the other, deduced from the former, and called the *subalterna*,—a particular or singular proposition, with the same subject and the same predicate. In all cases the subalternans and subalterna must agree in quality, e. g.—

A. All diseases are contagious.

I. Some diseases are contagious.

The principle on which subalternation proceeds is, that universals include particulars, but that particulars do not include universals.

From any universal proposition we may infer a particular subalterna; but before we can infer a *singular* subalterna, the subalternans must be metaphysically universal. The following is an example of a proposition metaphysically universal; viz.,

Every effect has a cause;

and as it is metaphysically universal (that is, admitting of no exceptions), we can infer from it not only the particular proposition,

Some effects have causes,

but also the singular proposition—

Gravitation has a cause.

The relation between a subalternans and a subalterna can scarcely be called *opposition*, in the common acceptation of the term, though it comes within the range of the definition of that term as here used.

In pronouncing on the truth or falsehood of propositions thus related, we have to consider how far we may infer the truth or falsehood of one of them from the truth or falsehood of the other; and in reference to subalternation, we have the four following axioms:—

1. The truth of the universal infers the truth of the particular,—for if it be true that

All islands are surrounded by water,

it must be true that

Some islands are surrounded by water;

and it is also true that

Sicily is an island surrounded by water.

In this example, however, we infer a *singular subalterna*, because the subalternans is metaphysically universal.

A sign of universality prefixed to the subject of a proposition does not, let it be observed, necessarily render that proposition metaphysically true, e.g., the following proposition:—

All children reverence their parents,

is only *morally* universal, and therefore admits of some exceptions; for all children do not reverence their parents; and hence, although from such a proposition we can infer with truth that

Some children reverence their parents,

we cannot infer this with regard to any particular *individual* contained in the subject; for it may be among the exceptions.

The truth of this axiom is equally valid in negative as in affirmative propositions; for if in affirmative propositions the predicate contains the whole extension of the subject, it contains a part; and if in negative propositions it excludes the whole, it excludes a part.

It will be seen from the foregoing, that the *subalternans* and the *subalterna*, deduced from it, differ in *quantity* but agree in *quality*.

2. The truth of the particular does not infer the truth of the universal.

The predicate of a proposition may agree with a part of the extension of the subject, yet it may not agree with the whole extension of the subject; for although it may be true that

Some wars are just,

it is not true that

All wars are just;

and although it may be true that

Some men have not an affectionate disposition,

it is not true that

No men have an affectionate disposition.

In reference to the terms of a proposition, it is to be laid down that in any inference no term can be changed from a particular to an universal; in other words, that an argument *a particulari ad universale* is invalid; for if any term is particular, a part of it only is said to agree or disagree with the other term. About the remaining part of it, therefore, nothing can be inferred.

3. The falsehood of the particular infers the falsehood of the universal.

In illustration of this axiom, it may be stated that if it be false that the predicate contains or agrees with any part of the extension of the subject, it must also be false that it contains the whole; for instance, if it is false that

Some men are patriotic,

it must be false that

All men are patriotic.

4. The falsehood of the universal does not infer the falsehood of the particular.

It may be false, for instance, that the predicate contains or excludes the whole extension of the subject, yet it may contain or exclude a part. Thus it may be false that

All men are logicians,

or that

No island is fertile;

yet it may be true that

Some men are logicians,

or that

Some islands are not fertile.

It must be observed, in relation to the four axioms, that we

are to understand by the universal and particular propositions mentioned, a *universal* and a *particular* deduced from it by subalternation.

On examining the four foregoing axioms, it will appear that they may be reduced to two, for the third is contained in the first, and the fourth in the second.

The third and fourth axioms differ from the first and second, in being their converses by contraposition.

It may be mentioned that Aristotle takes no notice of subaltern propositions. Its laws were first laid down by Apuleius, and the name given by Boëthius.

2. *Contrary Opposition.*

Contrary Opposition is between two universal propositions differing in *quality* only, viz., between A. and E.; as,

All trees possess vegetable life.
No trees possess vegetable life.

With regard to the truth of contrary propositions, both of them may be *false*, but they cannot both be *true*, or the one may be *false* and the other *true*.

When the opposed propositions are in *necessary* matter, the affirmative will be true and the negative false; e. g.—

A. All human institutions are imperfect.
E. No human institutions are imperfect.
A. All bad habits should be avoided.
E. No bad habits should be avoided.

When the opposed propositions are in *impossible* matter, the negative will be true and the affirmative false; e. g.—

E. None of the planets are stationary.
A. All the planets are stationary.
E. No island is under water.
A. All islands are under water.

When the opposed propositions are in *contingent* matter, both are false; but the particulars, whether affirmative or negative, are both true. The following propositions—

A. All children honour their parents,
E. No children honour their parents,

have the same terms; and these are used in each of the propositions in exactly the same sense; yet both the propositions are false—for in contingent matter universals are false, and particulars true; and all we can with truth assert is, that

I. Some children honour their parents.
O. Some children do not honour their parents.

With respect to contrary propositions it appears, therefore,—

1. That in necessary matter affirmatives are true, and negatives false.
2. That in impossible matter negatives are true, and affirmatives false; and,
3. That in contingent matter, both propositions are false.

3. *Sub-contrary Opposition.*

Sub-contrary Opposition subsists between two *particular* propositions differing in *quality*, viz., between I. and O.; e. g.—

Some minds are too much beclouded with prejudice to admit of the light of genuine science.
Some minds are not too much beclouded with prejudice, to admit of the light of genuine science.

Sub-contrary opposition has been so named, from the opposed propositions being under two universal contraries. Sub-contraries must have the same terms as the contraries to which they are related.

In *necessary* matter particular affirmatives are true, but particular negatives false; e. g.—

Some human institutions are imperfect.
Some human institutions are not imperfect.

In the former of these examples, the predicate agrees with the whole subject, and the proposition is consequently true; while, in the latter example, the predicate disagrees with the whole subject, and the proposition is consequently false.

In *impossible* matter particular negatives are true, but particular affirmatives false; e. g.—

Some of the planets are not stationary.
Some of the planets are stationary.

In the particular negative the predicate disagrees with the whole subject; and being in impossible matter, the proposition is true. In the particular affirmative the predicate is asserted of the whole subject; but being in impossible matter, the proposition is false.

In *contingent* matter sub-contrary propositions may both be true; e. g.—

Some men are astronomers.
Some men are not astronomers.

In the first of these examples the predicate is said to agree with *part* of the subject, and in the last the same predicate is said to disagree with *part* of the same subject. The predicate is therefore not really affirmed of the *same* subject, but of different parts of the same subject. Hence, both propositions are true. But between two sub-contrary propositions, in contingent matter, there is in reality no opposition. Sub-contraries cannot be both *false*, nor can they be both *true*, except in contingent matter. The very definition of *contingent* matter requires that it should be such as to allow the predicate to be at the same time asserted of some things contained under the subject, and denied of others.

With regard to sub-contrary propositions, it is evident, therefore,

1. That in necessary matter, affirmatives are true and negatives false.

2. That in impossible matter, negatives are true and affirmatives false; and,

3. That in contingent matter, both the propositions are true.

4. *Contradictory Opposition.*

Contradictory Opposition is that which subsists between two propositions, differing both in *quantity* and *quality*, viz., between A. and O. or E. and I.; e. g.—

A. All men are responsible.

O. Some men are not responsible.

Of all the kinds of opposition, the contradictory is the most perfect; for contradictories differ from each other in all points; in *quantity*, for one is universal and the other particular; in *quality*, for one is affirmative and the other negative. Hence it follows, that when a proposition is *true*, its contradictory must of necessity be *false;* and, conversely, if a proposition is false, its contradictory must be true. There can be no intermediate judgment. Consequently, contradictories can neither be both false nor both true together, for the falsity of the one establishes the truth of the other.

In order that two propositions should be directly contradictory, the terms of both the propositions must be used in exactly the *same sense* with respect to each other. The conditions necessary to ensure this are the following, viz., that the terms of the contradictories must be used:—

1. *Eodem modo*, in the same manner.
2. *Secundum idem*, as to the same part.
3. *Ad idem*, compared with the same thing.
4. *Eodem tempore*, existing at the same time.

If any one of these conditions be omitted, *is* and *is not* may be compatible, e. g., an opinion *is* and *is not* faith; it is a *dead* faith; it is not *living* faith. 2. Zoilus *is* and *is not* black; for his face *is* black, and his hair *is not* black, but red. 3. Socrates *has* and *has not* a full head of hair; for he *has*, if compared with Scipio, he *has not*, if compared with Xenophon. 4. Nestor *is* and *is not* old; for *he is*, if you speak of his third age, *he is not*, if you speak of his first.

The four requisites to a complete contradiction may be comprised in one rule, which is equally applicable to all the species of opposition, viz., that the subject and predicate of the opposing propositions must be employed in the *same sense* and in the *same manner* with respect to each other.

Let the opposing propositions be A. and O. in *necessary* matter, e. g.—

A. All men are responsible.
O. Some men are not responsible.

In the universal affirmative the predicate 'responsible' is asserted *universally* of the subject 'men,' and in the negative proposition the same predicate, used exactly in the same sense, is denied *partially* of the same subject, used also exactly in the same sense; but since the matter is *necessary*, the extremes of the affirmative agree essentially, and the proposition is consequently true; its contradictory, therefore, (the particular negative), which asserts the *partial* disagreement of the extremes, must be false.

Let the opposing propositions be E. and I. in *impossible* matter, e. g.—

E. No human institutions are perfect.
I. Some human institutions are perfect.

In the universal negative the predicate 'perfect' is denied *wholly* of the subject 'human institutions,' and in the particular affirmative the same predicate, used exactly in the same

sense, is asserted *partially* of the same subject, used also exactly in the same sense; but since the matter is *impossible*, the extremes of the negative disagree essentially, and the proposition is consequently true; its contradictory, therefore, (the particular affirmative), which affirms the partial agreement of the extremes, must be false.

Let the opposing propositions be A. and O. in *contingent* matter, e. g.—

A. All human inventions are beneficial to mankind.

O. Some human inventions are not beneficial to mankind.

In the universal affirmative, the predicate, 'beneficial to mankind,' is affirmed of the whole subject, 'human inventions;' but on examining the matter, it will appear that the connection between the extremes is not invariable and essential, and that all we can assert with truth is, that

Some human inventions are beneficial to mankind.

Hence there is a part of the subject with which the predicate does not agree; and with respect to the part excluded, it may be asserted that

Some human inventions are not beneficial to mankind.

Hence the particular negative is true, and its contradictory, the universal affirmative, false.

Let the quality of the above propositions be changed into E. and I., e. g.—

E. No human institutions are beneficial to mankind.

I. Some human institutions are beneficial to mankind.

And from the preceding illustration, it will be seen that the particular affirmative is true, and its contradictory, the universal negative, false.

In the case of contradictory propositions, it appears, therefore,—

1. That in necessary matter, affirmatives are true and negatives false.

2. That in impossible matter, negatives are true and affirmatives false; and,

3. That in contingent matter, universal affirmatives are false, and particular negatives true, and that universal negatives are false and particular affirmatives true.

5. *Opposition of Singular Propositions.*

It is difficult to refer the opposition of singular propositions (sometimes called *secondary contradiction*) to any particular kind of opposition. Ostensibly their opposition is that of *contrariety*, for their quantity cannot be changed.

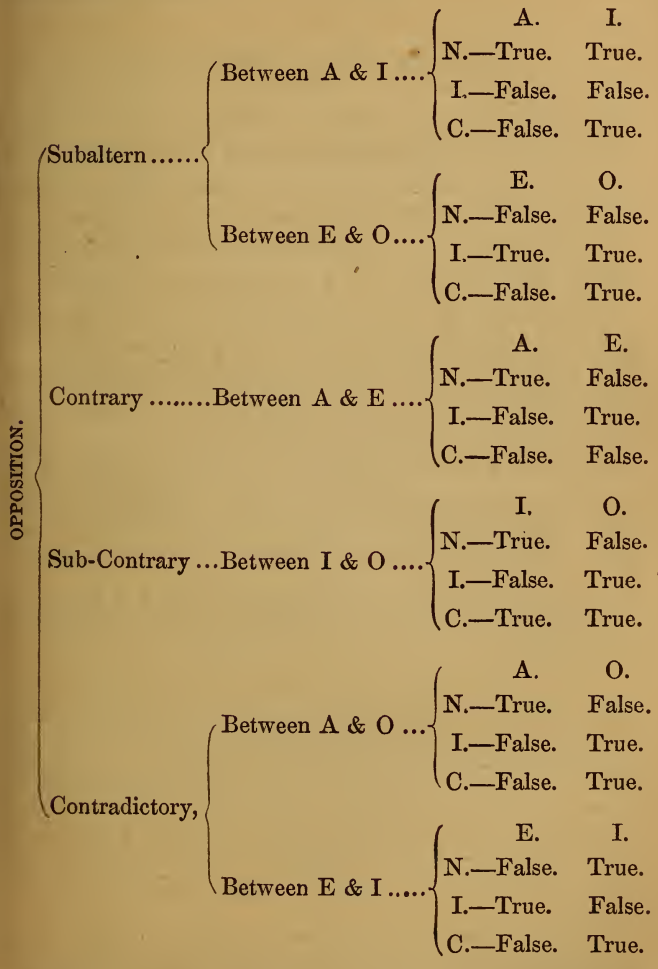
The matter of singular propositions cannot be contingent; and, consequently, two singular propositions cannot both be false, as may happen in the case of contraries, when they are both in contingent matter. The opposition of singulars is, therefore, not properly referrible to *contrariety.*

Singular propositions must be either in necessary or impossible matter; and hence the contrary to a singular proposition forms as perfect an opposition as the contradiction between universals and particulars, for they have the essential features of contradictories, viz., that the one is always true and the other false; for if a singular be true, its contrary must of necessity be false, and *vice versa*, since in necessary or impossible matter no two opposed propositions can be both true or both false together.

[NOTE.]

According to the formal view of logic, the words 'necessary,' 'impossible,' 'contingent,' should have no place in the doctrine of opposition; for in order to carry out the formal view consistently, the logician can take no account of the material truth or falsehood of a proposition. He has merely to do with the formal inferences or deductions which follow from the assumed truth or falsity of a premiss. It may be remarked, that, in reference to the doctrine of opposition, the formal view may be easily maintained by expressing the canons or axioms hypothetically.

The opposition of propositions is summarily presented in the annexed Scheme:—



In the above Scheme the letters **N I C** denote the matter of the propositions, viz., necessary, impossible, contingent. It has been preferred here to the scheme usually given in logical treatises, as more intelligible, and therefore more likely to secure attention.

SECTION IV.

OF THE CONVERSION OF PROPOSITIONS.

Conversion is the transposition of the subject of a proposition into the place of the predicate, and of the predicate into the place of the subject; but in the transposition, both the quality and the truth of the proposition must be preserved.[a]

The proposition to be converted is called the *convertend* or *exposita*, and that into which it is converted, the *converse*.

In legitimate conversion, the truth of the converse ought to follow from the convertend, because logical conversion must be *illative*, that is, the truth of the convertend necessitates the truth of the converse. If, therefore, the convertend is true, its logical converse must also be true.

Illative or inferential conversion is, when the truth of the converse may be intimated by the words 'therefore,' 'wherefore,' 'consequently,' &c.; hence these are called illative particles. But it should not be supposed, from the words 'illative' or 'inferential,' that this conversion is a process of reasoning,[b]—it is, in fact, only stating the same judgment in another form.

[a] The terms of a logical proposition are the noun and verb; the former as subject, the latter as predicate. In propositions *tertii adjacentis*, the copula and predicate are considered as equivalent to a single verb. When the terms are transposed, the noun must become a verb to form the new predicate, and the verb a noun to form a new subject. For this reason, all propositions should be resolved into the form *tertii adjacentis* before conversion, in order that the predicate may be freed from the consignification of time, so as to form a noun, and the copula may be left to unite with the subject, and form a verb.—*Mansel*, p. 49.

[b] Whether the *converse* is to be considered an *inference* is a question of some interest, from its having been a contested point among the scholastic commentators of Aristotle at an early date. There can be no doubt that Aristotle himself considered it an inference, from the labour he expends in endeavouring to

Hence it follows, that no converse may assert, more generally, than the convertend,—in other words, a consequence must not go beyond its premisses, and, consequently, what is affirmed in the convertend of a part only, cannot, in the converse, be affirmed of the whole. When we attempt to deduce from a proposition another which does not necessarily follow, it is said that there is no *vis consequentiæ*.

Illative conversion is of three kinds, viz., *simple conversion*, *conversion per accidens*, and conversion by *negation* or *contraposition*.

1.—*Simple Conversion.*

Simple conversion (ἁπλη αντιστροφη) is the mere transposition of the extremes of a proposition, without changing either the quantity or the quality. Hence, whether the convertend be universal or particular, affirmative or negative, the converse must retain the same attributes.

In order that a proposition may be simply convertible, its extremes must be co-extensive, i. e., both of them must be

demonstrate it. Reid is of opinion, however, that his demonstration is merely arguing in a circle, and remarks that, 'it is indeed a fault very difficult to be avoided, when men attempt to prove things that are self-evident.' Reid, nevertheless, considers the converse to be an inference. The converse unquestionably depends entirely for its truth on the convertend; but there is no reason why it should on that account be called an inference from it. Whateley's view is adopted in the text, only in reference to simple conversion; for converses obtained in this way are obviously the same judgments in another form. This does not, however, in all cases hold true in *accidental* conversion, for here the converse or inference is not necessarily the same as the convertend or exposita. In simple conversion the converse must retain the accidental quality of the convertend; the accidental converse, however, does not of necessity follow the truth of the convertend, except when the latter is true. Hence, if the convertend is false, its simple converse must also be false, but its accidental converse may be either true or false. Conversion per accidens is founded on the laws of subaltern opposition, in which the particular does not retain the accidental quality of the universal unless the universal is itself true.

distributed, as is the case in universal negatives; or neither of them distributed, as is the case in particular affirmatives. In either of these cases, the mere transposition of the extremes, without any alteration of the sign, does not interfere with the quantity, or the accidental quality (the truth or falsehood of the proposition). Hence, the only propositions which admit of simple conversion are universal negatives, and particular affirmatives, because in universal negatives both predicate and subject are universal terms, and therefore when transposed the universal predicate of the convertend becomes a universal subject to the converse. In particular affirmations again, both predicate and subject are particular terms, and as the converse does not require any terms but particulars, they are sufficient to render it particular and affirmative.

Of Universal Negatives.

The following proposition, viz.,

No true philosophers omit the enforcement of moral duty,

is simply convertible, for since both the terms are distributed, the proposition indicates that 'every true philosopher' differs from 'every person who omits the enforcement of moral duty;' while, on the other hand, it is equally true, that 'all who omit the enforcement of moral duty' differ from 'all true philosophers,' consequently, the proposition may be simply converted thus—

None who omit the enforcement of moral duty, are true philosophers.

But to take a more obvious example, viz.—

No angels are men.

It is asserted in this proposition, that there is no individual common to the extension of both terms, for no individual included in the extension of the subject 'angels' is included in

the extension of the predicate 'men;' and we may therefore affirm with certainty, that none of the individuals included in the extension of the predicate is found among the individuals included in the extension of the subject,—and consequently, the truth of the converse, viz.,

No men are angels,

necessarily follows.

Of Particular Affirmatives.

Particular affirmatives are simply convertible, for since the extremes of the convertend are both particular, which is the case in all particular affirmatives, they retain their original quantity when transposed in the converse, e. g.—

Some proud men occasionally stoop to acts of the basest servility.

may be simply converted thus—

Some who occasionally stoop to acts of the basest servility, are proud men.

The truth of the simple converse of a particular affirmative is proved by Aldrich as follows:—If the particular affirmative—*Some blacks are civilised*, is true, its contradictory, *No blacks are civilised*, is false, and so also is the simple converse of the contradictory, *No civilised beings are blacks*, therefore, the contradictory to this, viz., *Some civilised beings are blacks*, is true, which is the simple converse of the original proposition, *Some blacks are civilised.*

2.—*Conversion per Accidens.*

Conversion per accidens, or, as it has been termed, conversion by *restriction*, or *limitation*, or *particular conversion*, is exemplified, when together, with transposing the extremes, of the proposition, the quantity is also changed; in other

words, the quantity which is universal in the convertend is changed to particular in the converse, (the affirmation or negation of the original proposition being always, however, retained.) This kind of conversion may probably have been called *per accidens*,[a] inasmuch as it is not a conversion of the universal *per se*, but rather as containing the particular. The propositions which admit of accidental conversion are universal affirmatives, and universal negatives. When the latter is accidentally converted, it is on the principle of subalternation, for it may be simply converted, as shown above.

Universal Affirmatives.

This class of propositions may obviously be converted *per accidens;* for from the truth of a universal affirmative a true subaltern necessarily follows, and as the subaltern is a particular affirmative, it may be converted simply, and when so converted, it will be the accidental converse of the universal affirmative. Thus, if it is true that

Every poet is a man of genius,

it is also true that

Some poets are men of genius;

of which the simple converse must also be true, viz., that

Some men of genius are poets,

which is the accidental converse of the original proposition.

For the sake of clearness, the three propositions may be brought together :—

ORIGINAL PROPOSITION,...Every poet is a man of genius.
SUBALTERN,.....Some poets are men of genius.
ACCIDENTAL CONVERSE,...Some men of genius are poets.

[a] Per accidens, putting in the place of the subject, the quality, whether proprium or accident, which the predicate implies. By the old logicians, the proprium is constantly called 'accidens proprium.'—*Moberly*, p. 85.

The reason why a universal affirmative cannot be converted simply, or into an universal affirmative, is, that in that case the predicate of the convertend would become the subject of the converse ; but since the predicates of affirmative propositions are particular, we would be arguing, did we convert such propositions simply, *a particulari ad universale.*

There is a class of universal affirmatives, however, which may be simply converted, viz., reciprocal propositions. In such propositions the predicate is an adequate definition of the subject, as being co-extensive with it, e. g.—

Wine is the juice of the grape ;

simple converse—

The juice of the grape is wine.

All triangles are figures bounded by three straight lines ;

simple converse—

All figures bounded by three straight lines are triangles.

Cicero was the discoverer of Catiline's conspiracy ;

simple converse—

The discoverer of Catiline's conspiracy was Cicero.

The circumstances under which the subject and predicate reciprocate or change places with each other, without a change in signification, have been already explained.

Mathematical propositions may be referred to this class, e. g.—

All equilateral triangles are equiangular ;

simple converse—

All equiangular triangles are equilateral.

It is not necessary, however, to consider this last example, or its converse, as a universal proposition; for we are not speaking of *all* triangles, but only of *some* triangles, viz., those which are equilateral; we may therefore reduce it to a particular affirmative, and convert it simply as such, thus—

Some triangles, i. e., all the equilateral, are all the equiangular;

simple converse—

Some triangles, i. e., all the equiangular, are all the equilateral.

It may be remarked, that the accidental distribution of the predicate in affirmative propositions should not be allowed to affect an argument. An inference drawn from an accidental circumstance of this description would be illogical, for it supposes something to be known which is not made known by the premisses laid down. The inference would be correct in a *material* but not in a *formal* point of view.

Universal Negatives.

Universal negatives can be converted both *simply* and *per accidens*. For since the simple converse of a universal negative is true, the subaltern deduced from that simple converse is also true; thus, of the proposition,

No larks are web-footed birds,

the simple converse is,

No web-footed birds are larks;

of which simple converse the subaltern is,

Some web-footed birds are not larks;

and this is the converse *per accidens* of the original proposition.

Particular negatives cannot be converted either simply or per accidens; for since the subject of a particular negative is not distributed, the converse would require the predicate to be undistributed, which is impossible in negative propositions, whether universal or particular.

3. *Conversion by Contraposition or Negation.*[a]

Particular negatives, it has been said, cannot be converted either simply or per accidens, in the form of particular negatives, yet this class of propositions may be legitimately converted by shifting the sign of negation from the copula to the predicate, and thus rendering a particular negative a particular affirmative, in which form it may be simply converted; e. g., the proposition,

Some animals are not rational,

becomes affirmative by uniting the negative particle with the predicate, thus—

Some animals are not-rational, or irrational;

which may be simply converted into,

Some irrational beings are animals.

The application of this mode of conversion to particular negatives has the same effect as if the particle of negation were disjoined from the copula and made a part of the predicate, and the proposition then simply converted like an affirmative.

This mode of conversion may also be applied to universal affirmatives, in which, after transposing the terms, the negative particle is combined with the new subject, and the proposition made negative by affixing the negative particle

[a] This kind of conversion is not made any use of by Aristotle for logical purposes, although the principle may be gathered from his writings. It was first explained by Boethius.

to the copula, so as to form a contrary, viz., a universal negative, which in signification will be found to be exactly equipollent to the original, for to assert the presence of some attribute is the same thing as to deny its absence; e. g., the proposition,

All poets are men of genius,

by transposition and negation becomes,

All not men of genius are not poets;

which is exactly equipollent to,

No poets are not men of genius;

or,

None but men of genius are poets.

The following mnemonical lines may assist the learner in remembering the rules of conversion:—

Simpliciter fEcI, convertitur EvA per accid.
AstO per contra, sic fit conversio tota.

The two vowels in *feci*, E and I, represent universal negatives and particular affirmatives which are converted simply; the two vowels in *eva*, E and A, denote universal negatives and universal affirmatives which are converted accidentally; and the two vowels in *asto*, A and O, indicate universal affirmatives and particular negatives which are converted by negation or contraposition.

CHAPTER IV.

SECTION I.

OF SYLLOGISM.

HAVING already treated of simple apprehension and judgment, we now proceed to the third operation of the mind, viz., *reasoning*.

In an act of reasoning, we compare two terms or conceptions with some third term or conception; and in this way ascertain whether any relation does or does not subsist between the two original terms or conceptions. A simple act of reasoning of this description is termed a *syllogism*.

The term syllogism literally means a gathering or summing up; and, as used in logic, it signifies a gathering of the conclusion from the premisses.

According to Aristotle, 'a syllogism is a speech[a] in which certain things (the premisses) being supposed, something different from what is supposed (the conclusion) follows *of necessity*,[b] and this solely in virtue of the suppositions themselves.'

[a] The word λογος here translated 'speech' might be rendered a *sentence* or *thought*, for λογος means either *ratio* or *oratio*, i. e., a thought, or a thought expressed.

[b] The form or essence of a syllogism consists not in the truth of the judgment laid down, or that which is arrived at, but in the production of a new and distinct judgment, not a mere repetition of the antecedents, the truth of which cannot be denied without impugning those we have already accepted for true.

Aldrich defines a syllogism to be 'a speech in which certain things being laid down and granted, something else *must* follow distinct from but in virtue of those things which have been laid down and granted.'

It has been shown, when treating of the relative affections of propositions, that one judgment may follow from another; but in these the terms of the new proposition are the same as those of the original proposition. There, from one proposition another was inferred, consisting of the same terms, either in the same order, as in subalternation, or in a transposed order, as in conversion. In a syllogism, however, there must be more than *one* proposition either expressed or understood; and the inference deduced, although following immediately from the premisses, must not consist of the same terms as any of the propositions from which it is deduced, e. g.—

Every man is fallible.
The Pope is a man.
The Pope is fallible.

It is plain, however, that the propositions forming the premisses must have a necessary connection with each other; for if this were not the case, no conclusion could follow from them, e. g., from the propositions—

Paul was the Apostle of the Gentiles,
Rome was mistress of the world,

no conclusion can be inferred, because no connection exists between them; whereas, in fact, the connection between the premisses and the conclusion should be such, that from a knowledge of the former the mind should be led irresistibly to the latter.

The premisses, whatever be their matter, should be laid down as hypothetically true, inasmuch as the principles from which the conclusion is drawn are supposed to be known and granted.

The connection existing between the premisses and conclusion is termed in logic the *consequence;* and of this there are two kinds, viz., the *material* and the *formal.*[a]

The consequence is said to be *material,* when the conclusion follows from the premisses, in virtue of the matter of the argument, or the meaning necessarily attaching to the terms.

The consequence is said to be *formal,* when the conclusion is inferred from the premisses, in virtue of the *form of the expression.*

The formal consequence depends on the *disposition of the terms,* and cannot lead into error; but the material, as it depends solely on the *meaning of the terms,* may often lead to illogical conclusions.

Every simple syllogism consists of three terms, and no more, viz., the *subject, predicate,* and *middle term.*

Every syllogism consists of three propositions, viz., the *major,*[b] and *minor*[c] premisses, and the *conclusion.*[d]

The major and minor propositions are by a common name called *premisses,* as they precede the *conclusion.*

Every syllogism consists of two parts, viz., that which is proved, and that by means of which it is proved. That by means of which anything is proved is called the antecedent or premisses, and that which is proved is called the inference or conclusion.

[a] Crakanthorpe explains the *matter* and *form* of syllogisms thus:—'And as in a categorical proposition the two terms, namely, the subject and predicate, are the *matter;* the copula, on the other hand, which is the substantive verb, or some person of it, is the *form;* and as in a hypothetical proposition the two propositions are the *matter,* the conditional conjunction, copulative or disjunctive, which joins these propositions, is, as it were, its *form.* In like manner, also, in argumentation, the premisses and conclusion are its *matter,* and the illative mark, which unites them in the inference, is, as it were, the *form.*'—[Book 3, cap. 13.]

[b] ἡ προς τῳ μειζονι ακρῳ προτασις.

[c] ἡ προς τῳ ελαττονι ακρῳ προτασις.

[d] συμπερασμα.—*Aristotle.*

The proposition proposed to be either proved or disproved is at first called the *question* (το ζητουμενον), and when the syllogism is formed, this proposition becomes the *conclusion.* Hence, in the phraseology of logicians, the question and conclusion mean the same thing.

The predicate of the question is called the *major* term (μειζων ὁρος), and its subject the *minor* term (ελαττων ὁρος), but in relation to the middle term, they are by a common name designated *extremes.*

Any judgment, whether affirmative or negative, when verbally expressed, constitutes a proposition; and as every proposition must have a subject and predicate, the truth or falsity of the judgment enunciated by it depends on the agreement or disagreement of the terms representing the subject and predicate; and the nature of syllogistic reasoning is to prove the agreement or disagreement of these terms with some third term with which each of them is alternately compared in the premisses. This third term is by Aristotle called the middle term, not the *argument*, as usually stated.

The three propositions of a syllogism are called its *proximate matter;* and as they consist of three terms, these terms are called its *remote matter.*

In every correct syllogism, the middle term occurs twice in the premisses, but never in the conclusion.

The *major* term occurs in the major proposition; and this proposition may be easily discovered by observing, that premiss which consists of the middle term, and the *predicate* of the conclusion.

The major proposition is sometimes simply styled *the proposition.*

The *minor* term occurs in the minor proposition; and this proposition may readily be distinguished by observing that premiss which consists of the middle term and the *subject* of the conclusion.

The minor proposition is sometimes called the *assumption.*

The conclusion is designated variously the *collection, inference, deduction,* &c.

The disposition of the terms of a syllogism will be best illustrated by an example. Let the question be, 'Is Christianity worthy of belief?'

Whatever is of divine origin is worthy of belief.
Christianity is of divine origin.
Christianity is worthy of belief.

In this syllogism, 'worthy of belief,' i. e., the predicate of the conclusion, is the major term 'Christianity;' its subject is the minor term, and 'of divine origin' is the middle term.

The reason why the predicate of the conclusion is called the *major* term, and its subject the *minor*, is this, that the predicate of a *universal affirmative proposition* has generally a greater extension than its subject, and must at least have as great, for a universal affirmative asserts that the entire extension of the subject is contained in the extension of the predicate; and as a syllogism in which a universal affirmative conclusion can be deduced is deemed the most perfect kind, the extremes came to be invariably distinguished from each other by the names *major* and *minor*, on account of what is true of them when occurring in a universal affirmative conclusion.

The middle term in perfect syllogisms has a greater extension than the *minor*, but not so great as the *major;* and hence it has received the name of *middle.*

The reason why the major is called *the proposition*, and the minor *the assumption*, is, that when a syllogism is in its most perfect form, the major proposition is some generally admitted truth or principle, and therefore not likely to be called in question; and for this reason it is, by way of eminence, sometimes called the *proposition;* while the minor proposition may be objected to as being an *assumed* truth,

having particular reference to the question under consideration; and hence the name *assumption*, e. g.,—

Whatever acts with uniformity and consistency is the result of intelligence.

Nature acts with uniformity and consistency;

therefore,

Nature is the result of intelligence.

The major proposition in this example is a general truth which no one will call in question; but the minor, viz.,

Nature acts with uniformity and consistency,

is not a general truth, although accidentally it may be as well known.

It is more convenient, but by no means necessary to the accuracy of a syllogism, that the major proposition should be first in order. In material arguments, it often happens that the minor premiss is first, and, still more frequently, that the conclusion begins the sentence. Thus—

Habitual cheerfulness is the best promoter of health; for it checks those secret anxieties and those violent ferments which derange and wear out the constitution; and whatever has this excellent quality must have a tendency to promote health.

In every syllogism the major proposition consists of the major and middle terms; but whether the middle term is its subject or predicate depends on the figure of the syllogism.

In like manner, the minor proposition in every syllogism consists of the minor and the middle terms; but whether the middle term is its subject or predicate, depends also on the figure of the syllogism.

By the figure of a syllogism is meant the legitimate disposition of the middle term in the premisses; and as the middle term may be either the subject or predicate of the major, or

the subject or predicate of the minor, it may be disposed in four different ways; and, consequently, there are four figures.

In the first figure the middle term is the subject of the major and the predicate of the minor, e. g.—

Every *philanthropist* deserves to be held in remembrance.
Howard was a *philanthropist.*
Howard deserves to be held in remembrance.

In the second figure the middle term is the predicate of both premisses, e. g.—

The fixed stars do not *revolve about a centre.*
The planets *revolve about a centre.*
The planets are not fixed stars.

In the third figure the middle term is the subject of both premisses, e. g.—

Some acts of friendship are acts which militate against justice.
All acts of friendship appear virtuous to the thoughtless.
Some things which appear virtuous to the thoughtless militate against justice.

In the fourth figure the middle term is the predicate of the major and the subject of the minor, e. g.—

Some professors of the healing art are *quacks.*
All quacks practice on the ignorance of the public.
Some who practice on the ignorance of the public are professors of the healing art.

RULES OF SYLLOGISM.

All the rules of syllogism are based on the three following canons,[a] viz.,

1. If any two terms agree with one and the same third term, they agree with each other.

Let the question or problem be, 'Humility is worthy of constant cultivation.' The predicate, 'worthy of constant cultivation,' agrees with a third thing, viz., 'an ornament of the Christian character;' but the subject, 'humility,' agrees with the same third; therefore, the extremes agree with each other. Hence the following syllogism is correct:—

Every ornament of the Christian character is worthy of constant cultivation.

Humility is an ornament of the Christian character;

therefore,

Humility is worthy of constant cultivation.

2. If of two terms one agrees with the same third term, and the other disagrees with it, they disagree with each other.

Let the question or problem be, 'Literature is not within the reach of the idle.' The subject, 'literature,' agrees with a third thing, viz., 'an acquisition of real value;' but the predicate, 'within reach of the idle,' differs from that third.

[a] The canons and special rules of syllogism given in Murray's Compendium are here adopted. Aldrich gives six canons and twelve rules, many of which are superfluous, from being included in the others. It may be proper to remark, regarding the three canons given, that although clear as principles in mathematical reasoning, where they apply to equal magnitudes, they lose in some measure their definite meaning, when applied analogically to the agreement or disagreement of terms or conceptions in affirmative or negative propositions; for the relation of the middle term to the major and minor, as to extension, varies according to the different figures; and hence the comparison does not proceed on exact equality of *quantities*.

Therefore, the extremes disagree with each other; and the argument is thus expressed—

Acquisitions of real value are not within reach of the idle.
Literature is an acquisition of real value.
Literature is not within reach of the idle.

3. Two terms, of which neither agrees with the same third term with which they are compared, may agree or disagree with each other.

The agreement or disagreement of any two terms can only be ascertained by comparing each of them alternately with some one third term; but it may happen that no third term can be found with which to compare them, so as to discover whether both agree with it, or the one agree with it and the other differ from it; and therefore we cannot prove whether they agree with or differ from each other; for since no third term has been brought forward with which to compare them, it is matter of doubt whether any such third term can be adduced. And hence their agreement or disagreement cannot be established until this doubt is removed.

The use of a third term, in syllogistic argument, is indispensable; for no syllogistic argument can exist unless there be a comparison of some two terms with a third, on one or other of the principles contained in the first and second canons.

Those two canons may be considered as axioms, since they challenge immediate assent as soon as understood, and are the basis on which the syllogism is founded. They bear some analogy to the mathematical axioms:—Things which are equal to the same are equal to one another, and things of which one is equal and the other not equal to the same, are not equal to one another.

The validity of all *affirmative* conclusions depends on the first of these canons, and the validity of all *negative* conclusions on the second. When the condition mentioned in the third canon is present, there can be no conclusion.

These two canons are closely allied to the Dictum[a] de omni (κατα παντος) and the Dictum de nullo (κατα μηδενος), viz., that whatever is affirmed or denied of a whole class may be affirmed or denied of whatever is comprehended in that class. It is from conforming to these dicta that all syllogisms drawn in the first figure derive their validity; for whatever can be predicated of a whole subject or class is necessarily a predicate of all the subjects, whether particular or singular, contained in that subject; and, on the other hand, whatever predicate can be denied of a whole subject or class is necessarily denied of all the subjects, whether particular or singular, contained under that subject.

The rules of syllogism are of two kinds, viz., *general* and *special.*

The general rules apply to all syllogisms, in whatever figures they may be drawn. The special rules, again, have reference to particular figures.

The general rules are six :—

1. The middle term cannot be taken twice particularly in the premisses, but must be at least once universal, i. e., by being the subject of a universal, or the predicate of a negative proposition.

It is plain, that if the middle term be twice particular, it can in either premiss represent only a part of its significates, and may therefore be taken for different parts of the same universal whole, and then there will be in reality two middle terms; but it is with the same third term, and not with different parts of it, that the other terms must be compared. If, then, the middle term is not *distributed* in one or other of the propositions forming the premisses, the major and minor

[a] The dictum de omni et de nullo applies only to the first figure. The dicta applicable to the other figures are explained by Keckerman and Lambert, and will be noticed in their proper places.

terms will each be compared with only a part of it; and we cannot know that this may have been the *same part.* Hence one of the terms may have been compared with *one part* of the middle term, and the other with *another* part of it, e. g.—

Some *arts* are useful.
Logic is an *art.*
Logic is useful.

In this example, the middle term is twice particular; for in the major proposition there is a sign of particularity prefixed to it; and in the minor it is the predicate of an affirmative proposition. In the major proposition, therefore, the term 'useful' is only compared with a part of the middle term 'arts,' and in the minor proposition the term 'logic' may be compared with another part of the middle term. But since from the form of the expression we cannot assert that both the extremes have been compared with one and the same middle term, we cannot legitimately infer the conclusion, 'logic is useful,' but from such premisses as the following, viz.,—

All arts are useful.
Logic is an art.

We can legitimately infer the conclusion—

Logic is useful.

2. The extremes cannot be taken more universally in the conclusion than in the premisses.

This rule may be more clearly understood by the explanation, that a term must not be *distributed* in the conclusion which was not distributed in the premisses. The object of the rule is to guard against inferring a universal conclusion from particular premisses. When either the major or minor term is employed universally in the conclusion, but particularly in the premisses, this is termed an *illicit process* of the major or minor term. A term *undistributed* in the pre-

misses, and the same *distributed* in the conclusion, cannot be called *one* and the *same* term; and, consequently, to draw an inference from any term employed *particularly* to the same term employed *universally* is the same as to infer the truth of the universal from the truth of the particular; for a term distributed bears the same proportion to the same undistributed as a universal does to its particular, e. g.—

All innocent things are *allowable.*
Some pleasures are not innocent.
Some pleasures are not *allowable.*

In this example the major term 'allowable' is illicitly distributed, for it is particular in the major premiss, being the predicate of an affirmative proposition; but it is universal in the conclusion, being the predicate of a negative proposition. There are consequently two major terms, instead of *one,* and therefore four terms in the syllogism. The conclusion may be true notwithstanding, but its truth cannot be formally inferred from the premisses.

In the following example, viz.,

All beasts of prey are carnivorous.
All beasts of prey are animals.
All animals are carnivorous,

there is an illicit process of the minor term for the predicate of the minor proposition, 'animals' is used particularly in that proposition, but universally in the conclusion; consequently, the inference is illegitimate.

It is evident, from the two preceding rules, that the number of universal terms in the premisses must be at least one more than in the conclusion; for by the second rule every term that is universal in the conclusion must be also universal in the premisses; but besides this, by the first rule, the middle term, which never enters the conclusion, must be at least once universal in the premisses. Therefore, there must

at least be one universal term in the premisses more than in the conclusion.

It follows, that the number of universal terms in the premisses cannot exceed the number in the conclusion by more than *two*. For there can be but three universal terms in the premisses, as one of them, by the third rule, must be affirmative, and to afford three one of the premisses must be negative. But in this case the conclusion must be negative by the fifth rule, and will therefore have its predicate universal. And that the excess may be two, the premisses should be E and A, and the conclusion O, or, if the mood be affirmative, the premisses must be A and A, and the conclusion I, in order to preserve the required excess.

It follows, also, that the greatest number of particular terms that can occur in the premisses are *three*, when both are affirmative and one particular; and then the universal term that occurs in the premisses must be the middle term; and therefore there are two particular terms in the conclusion. If there are but two particular terms in the premisses, both are affirmative, or one particular; and so in either case the conclusion has a particular term. The excess is never more than one.

3. From two negative premisses nothing follows.

In this case a middle term is employed, from which both extremes differ; and, consequently, there can be no inference, e. g.—

No irrational being is accountable.
Man is not an irrational being.

Here the disagreement of the extremes with the middle term affords no ground for inferring that they either agree with or differ from each other. They may agree or differ; but these premisses will neither prove their agreement or disagreement.

4. From two affirmative premisses a negative conclusion cannot follow.

It must be assumed, in reference to this rule, that the premisses are not both particular; for in that case, as shown below, there could be no inference, and that there are not two middle terms; for in that case, there could be no legitimate conclusion, as has been explained above. If, therefore, there be but one middle term, and the extremes agree with it, and consequently with each other, the conclusion must be affirmative, e. g.—

Every science that tends to elevate our conceptions of the Deity is worthy of being studied;

Astronomy is a science tending to elevate our conceptions of the Deity; therefore,

Astronomy is worthy of being studied.

5. The conclusion follows the weaker part.

In logic a negative proposition is considered inferior to an affirmative, or weaker than it, and a particular weaker than a universal.

This rule may be divided into two parts:—

Part 1.—If one of the premisses be negative, the conclusion, as it follows the weaker part, will be negative also; for in this case one of the extremes agrees with the middle term, and the other disagrees with it, and by the second canon they consequently disagree with each other, and the conclusion is negative.

The premisses necessary to prove a negative conclusion are an affirmative and a negative, since the extremes can be shown to differ only by means of a middle term which agrees with the one and differs from the other, e. g.—

No mere man is infallible.

The Pope is but a mere man.

The Pope is not infallible.

Part 2.—If one of the premisses be particular, the conclusion will be particular, e. g.—

All flowers are beautiful.

Some deciduous plants are flowers.
Some deciduous plants are beautiful.

In this example there are three particular terms in the premisses, viz., the two predicates, and the subject of the particular proposition; consequently, there is but one universal term in the premisses, viz., the subject of the major proposition; and hence there can be no universal term in the conclusion, since the premisses must contain, at least, one more universal term than the conclusion. Hence the subject of the conclusion must be particular, and therefore the conclusion itself.

Again, if one of the premisses be negative, let them be A and O, e. g.—

Every man is an animal.
Some living things are not animals.
Some living things are not men.

In this example there are two particular terms in the premisses, viz., the predicate of the major proposition, and the subject of the minor; therefore, there are but two universal terms, viz., the subject of the major proposition and the predicate of the minor, and consequently, but one in the conclusion, which must be its predicate, as the conclusion is negative. Hence the subject of the conclusion is particular, and therefore the conclusion itself.

Again, if the premisses are not A and O, they must be E and I, e. g.—

No works of human invention are perfect.
Some machines are works of human invention.
Some machines are not perfect.

In this example there are also two particular terms in the premisses, viz., the subject and predicate of the minor; therefore, there are but two universal terms, viz., the subject and

predicate of the major proposition, and consequently, but one in the conclusion, which must be its predicate. Hence the subject of the conclusion is particular, and therefore the conclusion itself.

6. From two particular premisses nothing follows.

If both propositions be affirmative, there will be no universal term in the premisses, and consequently, the middle term will be twice particular, e. g.—

Some sciences are worth knowing.
Some arts are worth knowing.
Some arts are sciences.

In this example the middle term is not distributed in either premiss, and consequently, no legitimate conclusion can be inferred.

If, again, one of the premisses be affirmative, and the other negative, there will be but one universal term, viz., the predicate of the negative proposition, and if a conclusion follow, it will be negative, and therefore its predicate universal; consequently, there will be as many universal terms in the conclusion as in the premisses, e. g.—

Some talented men are not good men of business.
Some Englishmen are good men of business.
Some Englishmen are not talented men.

In this example there is an illicit process of the major term; for while it is used particularly in the premiss, it is employed universally in the conclusion, being the predicate of a negative proposition.

Universal premisses do not always warrant a universal conclusion; but when a universal conclusion can be drawn. it is allowable to deduce a *particular*, for the truth of the particular is implied in that of the universal.

In testing the correctness of a syllogism by the foregoing general rules, we must see—

1. That the middle term has been distributed.

2. That no term has been employed more universally in the conclusion than in the premisses.

3. That both the premisses are not negative.

4. That a negative conclusion is not inferred from affirmative premisses.

5. That if one of the premisses be particular, the conclusion must be particular; and that if one of the premisses be negative, the conclusion must be negative.

6. That from two particular premisses no conclusion can be inferred; and,

7. That the conclusion is not particular where a universal may be inferred.

SPECIAL RULES OF SYLLOGISM.

First Figure.

The special rules of the first figure are two:—

1. The minor must be affirmative.

2. The major must be universal.

The special rules of syllogisms are founded on the principles implied in each figure. In the first figure the argument is from a general to a specific statement; and hence we infer an attribute to belong, or not to belong to something, because it belongs or does not belong to a class in which that thing is contained. But in order to advance a general statement, the major must be universal, while the specific statement can only be inferred from it by means of an affirmative minor.[a]

[a] The use of an argument in this figure implies that we possess (or conceive ourselves to possess) all required knowledge about both the subject and the predicate, which are the terms of our reasoning. The major premiss is a metaphysical proposition, ascribing a distinct predicate, whether proprium or accident to a known genus or higher kind; the minor premiss is a logical proposition, including in this genus a known species or lower kind. The former premiss implies a sufficiently complete act of logical definition; the latter a sufficiently complete act of logical division.—*Moberly*, p. 100.

In syllogisms drawn in the first figure, the middle term, or medium of proof, is less extensive than the major, and more extensive than the minor.

The middle term is the subject of the major proposition, and the predicate of the minor, e. g.—

All *luminous bodies* emit particles of light.
The sun is a *luminous body*.
The sun emits particles of light.

1. *Of the Minor Proposition.*

If the minor be negative, the major will be affirmative by the third general rule, and its predicate therefore particular, while the conclusion will be negative by the fifth general rule, and its predicate universal; but in the first figure the major proposition and the conclusion have the same predicate, viz., the major term. The major term would therefore be *particular* in the major proposition, and *universal* in the conclusion; but by the second general rule, a term cannot be employed more universally in the conclusion than in the premisses; for this would be arguing *a particulari ad universale.* The minor must therefore be affirmative.

2. *Of the Major Proposition.*

Since the minor must be affirmative, the major proposition must be universal; for if the major proposition is particular, the middle term, which is its subject, will also be particular; but since the minor must be affirmative, the middle term, which is its predicate, will be particular in it also; the middle term will therefore be taken twice particularly contrary to the first general rule, and any inference drawn will be invalid. The middle term must therefore be distributed in the major premiss, in which by the first figure it is the subject, and universals alone distribute their subject. Any syllogism then,

in the first figure, will be inconclusive in which the minor is negative or the major particular.

In the first figure,

The major may be A or E.

The minor may be A or I.

The conclusion may be A, I, E, or O.

Second Figure.

The special rules of the second figure are two :—

1. One or other of the premisses (and therefore the conclusion) must be negative.

2. The major must be universal.

In the second figure the middle term is the predicate of both premisses, e. g.—

No honest reasoner resorts to *sophistical arguments.*

Some sectaries resort to *sophistical arguments.*

Some sectaries are not honest reasoners.

In syllogisms drawn in the second figure, the middle term or medium of proof is more extensive than either the major or minor term.

The principle[a] of this figure is to prove a distinction or disagreement between two classes, or between one class and a portion of another, by showing that an attribute possessed by the one is wholly excluded by the other; for if one term

a The distinctive principles of this and the two following figures are founded on the conclusions arrived at by Lambert. The second figure is suited to the discovery or proof of distinctions between things, and its principle is called the *dictum de diverso*. The third figure is suited to the discovery or proof of instances and exceptions. Its principle is termed the *dictum de exemplo*. The fourth figure is suited to the discovery or exclusion of the different species of a genus. Its principle is designated the *dictum de reciproco*. The invention of these *dicta*, though generally attributed to Lambert, properly belongs to Keckerman, who published them about a century earlier. Lambert may, however, claim the invention of the dictum of the fourth, as this figure was rejected by Keckerman.

is contained in, and another excluded from, a third term, they are mutually excluded. For this reason, the leading proposition of the antecedent must be universal, and one of the premisses negative, e. g.—

Every planet describes an orbit.
The sun does not describe an orbit.
The sun is not a planet.

No planet is fixed.
Every star is fixed.
No star is a planet.

Of the Negative Premiss.

In the second figure the middle term is the predicate of both premisses; and hence, if both the premisses are affirmative, the middle term will be particular in each, contrary to the first general rule. In the second figure, therefore, a correct affirmative conclusion can in no case be drawn.

Of the Major Premiss.

It will be seen, from what has been said above, that one of the premisses must be negative, and consequently, the conclusion; but the predicate of the conclusion is universal, being the predicate of a negative proposition, and by the second general rule, it must be universal also in the major proposition, where it is the subject. The major premiss must therefore be universal in this figure; and any syllogism drawn in it, in which both the premisses are affirmative, or the major particular, will be illegitimate.

In the second figure,
The major may be A or E.
The minor may be E, O, A, or I.
The conclusion may be E or O.

Third Figure.

The special rules of the third figure are two :—

1. The minor must be affirmative.

2. The conclusion must be particular.

In the third figure the middle term is the subject of both premisses, e. g.—

All men of wit are desirable companions.
Some men of wit are indolent.
Some indolent men are desirable companions.

The principles of the third figure are two :—1. If two attributes belong to the same class, or the same part of the same class, they may co-exist in the same class or subject. Hence the subjects will partly agree, the attributes not being incompatible or opposed to each other; but in this case the conclusion must be particular, e. g.—

All men are responsible.
All men are mortal.
Some mortal beings are responsible.

For if 'responsibility' and 'mortality' are both predicable of the species 'man,' as asserted in the premisses, it must follow that 'some mortal beings are responsible.'

2. If of two attributes one belongs to a certain class, and the other is excluded from the same class, or the same part, the attributes do not universally co-exist in the same subject; and in this case also, the conclusion must be particular, e. g.—

Some men are not virtuous.
All men are responsible.
Some responsible beings are not virtuous.

For since the attribute 'virtue' is excluded from some men, and the attribute 'responsibility' is predicable of all men,

the attribute 'virtue' is separable from the attribute 'responsibility;' and hence it follows, as a particular conclusion, that some responsible beings are not virtuous.

In syllogisms drawn in this figure, the middle term or medium of proof is less extensive than either the major or minor term.

The minor must be affirmative.

If the minor is negative, the major will be affirmative, by the third general rule, and then its predicate will be particular; but in this case the conclusion would be negative, and its predicate, the major term, would be universal in the conclusion, and particular in the major proposition, where it is also the predicate, contrary to the second general rule; but this has been shown, when explaining the same special rule, in the first figure.

The conclusion must be particular.

Since the minor proposition must be affirmative, as shown above, the minor term, as its predicate, is particular in it; and as no term can be used more universally in the conclusion than in the premisses, it must be particular in the conclusion also, where it is the subject; and consequently the conclusion itself must be particular. Hence any syllogism in the third figure will be illegitimate in which the minor is negative or the conclusion universal.

In the third figure,

The major may be A, E, I, or O.

The minor may be A or I.

The conclusion may be I or O.

Fourth Figure.

The special rules of the fourth figure are three:—

1. If the major be affirmative, the minor must be universal.

2. If the minor be affirmative, the conclusion must be particular.

3. In negative moods (i. e., if any proposition be negative) the major must be universal.

In the fourth figure the middle term is the predicate of the major proposition, and the subject of the minor, e. g.—

All wise statesmen *legislate with caution.*

All who *legislate with caution* regard the interests of the community.

Some who regard the interests of the community are wise statesmen.

The peculiar principle of the fourth figure is this:—If the whole or part of a class is contained in another, and that also in a third, then the first class must contain some individuals belonging to the third. If, again, one class universally excludes another, which is in whole or in part contained in a third, the first is in part excluded from the third. But, on the other hand, if one class is universally contained under another, from which a third is wholly excluded, the third is wholly excluded from the first. Hence there cannot be a universal affirmative conclusion.

Illustration of the rules:—

1. *If the major be affirmative, the minor must be universal,* e. g.—

Worldly honours are transient vanities.

All transient vanities are sources of certain disappointment.

Some sources of certain disappointment are worldly honours.

In this example the major is affirmative, and its predicate, the middle term, therefore particular; but the middle term is also the subject of the minor; and if the minor were particular, its subject would be particular; and in this case the middle term would not be at all distributed in the premisses. The minor must therefore be universal, in order that its subject, the middle term, may be universal.

2. *If the minor be affirmative, the conclusion must be particular*, e. g.—

Some learned men are *egotistical.*
All *egotistical* men are fond of popularity.
Some persons fond of popularity are learned men.

In this example the minor is affirmative, and the conclusion must therefore be particular; for since the minor is affirmative, its predicate is particular; but the predicate of the minor proposition is the same as the minor term or subject of the conclusion; the subject of the conclusion must therefore be particular, and therefore the conclusion itself.

3. *In negative moods the major must be universal*, e. g.—

No fallacious arguments are *legitimate means of persuasion.*
Some *legitimate means of persuasion* fail in convincing.
Some things which fail in convincing are not fallacious arguments.

If either of the premisses be negative, the major must be universal, else the major term, which is the subject of the major proposition, would be particular; but the subject of the major proposition, and the predicate of the conclusion, are the same; and as the conclusion is negative, its predicate will be universal. The major term must therefore be universal in the major proposition; otherwise the inference would be *a particulari ad universale.*

It is obvious, therefore, that any syllogism in the fourth figure will be illegitimate—1. If the major be affirmative, and the minor particular; 2. If the minor be affirmative, and the conclusion universal; and, 3. If the conclusion be negative, and the major particular.

In the fourth figure,
The major may be A, E, or I.
The minor may be A, E, or I.
The conclusion may be E, I, or O.

The fourth figure, introduced here merely to show all the possible ways in which the middle term can be arranged in the premisses, is not of Aristotelic origin.[a] It is attributed to Galen (hence called the *Galenic* figure) on the authority of Averröes; but the words of Averröes—viz., *Et ex hoc planum, quod figura quarta, de qua meminit Galenus, non est syllogismus super quem cadet naturaliter cogitatio*—are by no means decisive on the point. Aldrich truly says that this figure is nugatory, as it proves the middle term by itself. This we shall illustrate by the following example and analysis from Hill's notes on the Compendium, viz.—

All metaphysical inquiries are involved in some degree of obscurity;

But all things involved in obscurity are liable to error; therefore,

Some things liable to error are metaphysical inquiries.

This syllogism predicates the medium 'involved in obscurity' of the major term 'metaphysical inquiries;' this is predicated, in the conclusion, of the minor term, 'things liable to error;' and this minor term is predicated in the minor premiss of the medium, 'involved in obscurity'—that is, the class of 'things involved in obscurity' is represented to comprehend all 'metaphysical inquiries;' the term 'metaphysical inquiries' is asserted to comprehend 'some things liable to error,' and 'some things liable to error' are represented to comprehend 'everything that is involved in obscurity.' Thus it is implied in a circle, that 'things involved in obscurity' comprehend 'things involved in obscurity,' which is nugatory.

[a] Aristotle acknowledges only three figures, and regards the middle term, in reference to its extension, as compared with the major and minor, rather than with reference to its position in the premisses.

The following table presents at one view the special rules of the figures, with their respective proofs :—

Fig.	RULES.	PROOFS.
1	Minor premiss affirmative...	Else illicit process of the major term.
	Major universal.....	Else middle not distributed.
2	One premiss negative.....	Else middle not distributed.
	Conclusion negative.....	Because of the negative premiss.
	Major universal.....	Else illicit process of the major term.
3	Minor affirmative.....	Else illicit process of the major term.
	Conclusion particular.....	Else illicit process of the minor term.
4	Major premiss not O.....	Else illicit process of the major term.
	Minor premiss not O.....	Else middle not distributed.
	Conclusion not A.....	Else illicit process of the minor term.

The following table represents the propositions according to the quantity and essential quality which are admissible in each figure :—

Fig.	Major Proposition.	Minor Proposition.	Conclusion.
1	Universal.....	Affirmative.....	Any.
2	Universal*.....	Any	Negative.
3	Any.....	Affirmative	Particular.
4	Any except O.....	Any except O.....	Any except A.

* In the second figure one premiss is negative.

The Moods of Syllogism.

The mood of a syllogism is defined by Aldrich to be, *Legitima determinatio propositionum secundum quantitatem et qualitatem*, i. e., the legitimate determination of the propositions with respect to quantity and quality.

When, therefore, the three propositions of a syllogism are laid down in their proper order, as to their *quantity* and *quality*, the mood of the syllogism is determined.

Vicious and illegitimate moods are of course excluded from the class of syllogisms to which the above definition applies. Vicious moods are designated paralogisms.

Any three propositions in combination form a mood; and as there are, in all, four kinds of propositions, and as each of these four kinds may be used as a major premiss, while each of these major premisses admits of four different minors, viz., A, E, I, or O, there may be formed four times four, or sixteen pairs of premisses; and to each of these premisses may be subjoined a fourfold conclusion, viz., A, E, I, or O; consequently, all the permutations that can possibly be formed amount to sixty-four.

Of these sixty-four varieties, eleven only are found to be legitimate moods of syllogism. Consequently, fifty-three are excluded as violating some of the general rules, and are therefore paralogisms.

These permutations are of course nothing more than an arithmetical calculation, for the number of combinations that can be formed by any four things, taken three and three together, is $4 \times 4 \times 4 = 64$.

Of these, sixteen, viz., EEA, EEE, EEI, EEO, EOA, EOE, EOI, EOO, OEA, OEE, OEI, OEO, OOA, OOE, OOI, OOO, are excluded by the third general rule, because their premisses are negative.

Twelve, viz., IIA, IIE, III, IIO, IOA, IOE, IOI, IOO, OIA,

OIE, OII, OIO, are excluded by the sixth general rule, because their premisses are particular.

Twelve, viz., AEA, AEI, AOA, AOI, EAA, EAI, EIA, EII, IEA, IEI, OAA, OAI, are excluded by the fifth general rule, because one of the premisses is negative, but not the conclusion.

Eight, viz., AIA, AIE, AOE, EIE, IAA, IAE, IEE, OAE, are excluded also by the fifth general rule, because they have universal conclusions with a particular premiss.

Four, viz., AAE, AAO, AIO, IAO, because they have negative conclusions without any negative premiss.

To which must be added IEO, for an illicit process of the major in every figure.[a]

Fifty-three moods (16 + 12 + 12 + 8 + 4 + 1) are therefore excluded, many of which offend against several rules, although one alone is noted.

The following is a list of the eleven legitimate moods, viz., AAA, AAI, AEE, AII, AEO, AOO, EAE, EAO, EIO, IAI, OAO.

But these moods cannot be used legitimately in each figure, for the first excludes all such as have not a universal major and an affirmative minor. Six of the above moods, therefore, can only be used legitimately in the first figure, viz., AAA, AAI, AII, EAE, EAO, EIO.

But of these two AAI and EAO, although conclusive, are useless in the first figure, since, instead of a particular, the premisses warrant a universal conclusion; for the minor term, being universal in the minor proposition, may be universal also in the conclusion. There are therefore only four

[a] IEO has been condemned ever since the days of Apuleius, as far as the second and third figures are concerned. It was sometimes allowed in the first, as the indirect mood Frisesmo, but should not have been retained by Aldrich, who does not recognise the indirect moods. With a direct conclusion, it manifestly produces an illicit process of the major term.—*Mansell*, p. 65.

moods used in the first figure, viz., AAA, EAE, AII, EIO. The following are examples:—

bAr—Every effect is the result of an adequate cause.
bA—The world is an effect; therefore,
rA.—The world is the result of an adequate cause.

cE—No subject of a highly solemn character is suited to poetry.
lA—Religion is a subject of a highly solemn character; therefore,
rEnt.—Religion is not suited to poetry.

dA—All comets are irregular planets.
rI—Some luminous bodies are comets.
I.—Some luminous bodies are irregular planets.

fE—No afflictions of nature are disgraceful.
rI—Some personal deformities are afflictions of nature.
O.—Some personal deformities are not disgraceful.

In the second figure no mood can be used legitimately in which the major is not universal and the conclusion negative. The legitimate moods of the second figure are consequently five, viz., AEE, AOO, EAE, EAO, EIO. But of these EAO would be useless, as the premisses warrant a universal conclusion. Hence the moods used in the second figure are only four, viz., EAE, AEE, EIO, AOO, e. g.—

cEs—No ruminant animals are predaceous.
A—The lion is predaceous.
rE.—The lion is not a ruminant animal.

cAm—Every planet describes an orbit.
Es—The sun does not describe an orbit.
trEs.—The sun is not a planet.

fEs—No man of strict veracity sports with truth.
tI—Some jocose men sport with truth.
nO.—Some jocose men are not of strict veracity.

BA — All honest reasoners weigh the arguments of an opponent with caution.
ROK — Some sectaries do not weigh the arguments of an opponent with caution; therefore,
O.—Some sectaries are not honest reasoners.

In the third figure no moods can be used except those whose minor is affirmative, and whose conclusion is particular. Of these there are six, viz., AAI, AII, EAO, EIO, IAI, OAO. None of these is useless, because although the minor be A, yet the minor term is particular in it as its predicate, and must therefore be particular in the conclusion. The following are examples of all the moods:—

DA—All who assist in the progress of true science deserve the respect of mankind.
RAP—All who assist in the progress of true science have to contend with difficulties.
TI.—Some who have to contend with difficulties deserve the respect of mankind.

DIS—Some acts of friendship are acts which militate against justice.
AM—All acts of friendship appear virtuous and splendid to the thoughtless.
IS.—Some things which appear virtuous and splendid to the thoughtless militate against justice.

DA—All moral agents are responsible for their conduct.
TIS—Some moral agents are subject to severe temptations.
I.—Some subject to severe temptations are responsible for their conduct.

FE—No branch of science is altogether perfect.
LAP—All branches of science are worthy of diligent culture.
TON.—Some things worthy of diligent culture are not altogether perfect.

bOk—Some distinguished poets have not escaped poverty.
Ar—All distinguished poets do honour to their country.
dO.—Some who do honour to their country have not escaped poverty.

fE—No bombastic writers are worthy of imitation.
rIs—Some bombastic writers are amusing.
On.—Some things amusing are not worthy of imitation.

In the fourth figure the legitimate moods are five, viz., AAI, AEE, EAO, EIO, and IAI. The following are examples of all the moods:—

brAm—All wise statesmen legislate with caution.
An—All who legislate with caution regard the interests of the community.
tIp.—Some who regard the interests of the community are wise statesmen.

cAm—All the planets are opaque bodies.
En—No opaque bodies are capable of transmitting light in any other way than by reflection.
Es.—No bodies capable of transmitting light in any other way than by reflection are planets.

dIm—Some learned men are deeply involved in prejudice.
Ar—All who are deeply involved in prejudice are suspicious advisers.
Is.—Some suspicious advisers are learned men.

fEs—No factious man is truly religious.
Ap—All truly religious men are charitable.
O.—Some charitable men are not factious.

frEs—No fallacious argument is a legitimate mode of persuasion.
Is—Some legitimate modes of persuasion fail in convincing.
On.—Some things which fail in convincing are not fallacious arguments.

Although eleven moods were stated to be admissible, yet some of them occur in more than one figure; and since each separate occurrence is reckoned a new mood, from this recurrence of the same symbols in different figures, there are reckoned in all nineteen moods.

On examining the vowel symbols used to represent the moods admissible in the different figures, it will be found that of the eleven legitimate moods six occur twice in different figures, viz., AAI in Darapti and Bramantip, AEE in Camestres and Camenes, AII in Darii and Datisi, IAI in Disamis and Dimaris, EAE in Cesare and Celarent, and EAO in Felapton and Fesapo. The mood EIO occurs in all the figures, viz., in Ferio, Festino, Ferison, and Fresison. Add to these, three moods that only occur once, viz., AEO, AOO, OAO, and we have nineteen moods.

For these nineteen moods logicians have formed certain names, which serve to denote the mood and figure; for it has been shown that the same mood is used in different figures. Hence the vowels which denote the mood would not alone point out the figure, and they have therefore been incorporated in words which are of great use in reduction, as will be hereafter seen.

The names are exhibited in the following lines, which mention also the figures to which they respectively belong:—

Barbara, Celarent, Darii, Ferioque prioris.
Cesare, Camestres, Festino, Baroko secundae.
Tertia, Darapti, Disamis, Datisi, Felapton.
Bokardo, Ferison habet, Quarta insuper addit.
Bramantip, Camenes, Dimaris, Fesapo, Fresison.

In addition to these, there are five *nameless* moods, viz., AAI and EAO in the first figure, AEO and EAO in the second figure, and AEO in the fourth. These are deemed superfluous, being superseded by other moods, having the same premisses with universal conclusions; for the conclusions in the nameless moods are all particular, and may be

considered as deduced by subalternation from the universal conclusions. And since the truth of the universal implies the truth of the particular, the nameless moods are of no practical use in strict argument, for it is needless to infer a particular where a universal conclusion can be deduced.

These moods, although useless, are not illegitimate.

There are no useless moods in the third figure, for a universal conclusion cannot be drawn in that figure.

The mood AAA belongs exclusively to the first figure. It is excluded from the second, because the mood is affirmative; from the third, because the conclusion is universal, and from the fourth, because in that figure the conclusion is always particular when the minor is affirmative.

A universal *affirmative* conclusion can be deduced only from two universal affirmative premisses in the first figure, in the mood *Barbara*.

Universal *negative* conclusions may be proved by the first figure in *Celarent*, by the second figure in *Cesare* and *Camestres*, and by the fourth figure in *Camenes*.

Particular *affirmative* conclusions may be proved in the first figure by *Darii*, and the nameless mood, AAI, by the third figure in *Darapti*, *Disamis*, and *Datisi*, by the fourth figure in *Bramantip* and *Dimaris*.

Particular *negative* conclusions may be proved by each of the figures, viz., in *Ferio* of the first, *Festino* and *Baroko* of the second, *Felupton*, *Bokardo*, and *Ferison* of the third, *Fesapo* and *Fresison* of the fourth, together with the subalternates of the four moods by which universal negatives are proved.

SECTION II.

REDUCTION OF SYLLOGISMS.

The first figure of syllogism is considered *perfect*,[a] and the other three as *imperfect*, although the same designations are given to moods under each.

The first figure is said to be perfect, for two reasons—

1. It proceeds directly and immediately on the *Dictum de omni et de nullo*; and, 2. It arranges the terms in the most natural order, so as to show at once their mutual relations.

The first figure asserts in the major proposition, that an attribute expressed by the predicate is found in a whole class without exception, that class being expressed by the subject of the proposition, and states in the minor proposition, that another class or part of it, expressed by the subject, is contained within the former class, now the predicate of the minor, and it is therefore inferred that the subordinate class has all the qualities found in the larger class to which it belongs. This may be seen more clearly from an analysis of the following syllogism :—

Every effect has a cause.
Gravitation is an effect.
Gravitation has a cause.

This syllogism exemplifies the *Dictum de omni*. The predicate 'cause,' in the major proposition, is affirmed of every-

[a] In some logical treatises, *perfect* and *imperfect* syllogisms are confounded with the *direct* and *indirect*. The latter designations are an innovation of the schoolmen. In an indirect syllogism, properly speaking, the minor is the *predicate*, and the major the *subject* of the conclusion, and from which the immediate conclusion is not inferred, but its converse. In a direct mood the predicate of the conclusion is the major term.

thing that can be termed an 'effect,' without any exception. Now the singular term 'gravitation,' the subject of the minor proposition, is contained in the common term 'effect,' which latter term is now the predicate of the minor. Hence if the predicate can be affirmed of everything represented by the common term 'effect,' it may also be affirmed of any one thing contained under it.

The following syllogism, viz.—

No man is infallible,
The Pope is a man,
The Pope is not infallible,

exemplifies the *Dictum de nullo*. The predicate 'infallible,' in the major proposition, is denied of every individual contained under the common term 'man' without any exception. But the singular term 'Pope,' the subject of the minor proposition, is contained in the common term 'man,' which latter term is now the predicate of the minor. Hence since the predicate 'infallible' is denied of everything denoted by the common term 'man,' it may also be denied of any individual contained under it.

In the other figures the 'Dictum' is applied indirectly and partially, and the relation of the terms is not shown by their position. The first figure, therefore, institutes the most obvious comparison of the extremes, and furnishes conclusions of all kinds, while the other figures furnish only certain kinds of conclusions.

It must be remembered, however, that the principle of the first figure is implied in all the other figures, notwithstanding their peculiarities, and that it is the presence of this principle that warrants their reduction.

To reduce a syllogism is to bring an *imperfect* mood to a *perfect*, i. e., to reduce a syllogism drawn in any of the last three figures to a corresponding figure of the first, by altering the arrangement of the premisses. By this process the

arrangement of the terms is not only improved, but the comparison is rendered closer, and the conclusion more obvious, as we then can apply to each, as the case may be, the Dictum de omni et de nullo. Hence reduction is often called *demonstration*, because it shows the validity of imperfect moods by bringing them to corresponding moods of the first figure, which furnish either the same conclusions or such as are equivalent by conversion.

The imperfect mood to be reduced is called the *reducend*, and that to which it is reduced the *reduct*.

Reduction is of two kinds—

1. Direct or ostensive reduction.
2. Indirect or reductio per impossible.

Ostensive reduction consists in bringing the premisses of the reducend to a corresponding mood in the first figure, by transposition or conversion of the premisses, and from the premisses thus changed, deducing either the original conclusion or one from which it follows by conversion.

In this species of conversion no new terms or propositions are introduced; those of the reducend being either transposed or converted. The validity of ostensive reduction depends on the perfection of the reduct; for since the reduct, being a perfect mood of the first figure, must yield a true conclusion, it is inferred that the original conclusion of the reducend is true, because it is found to be the same with the conclusion of the reduct, or implied in it.

Indirect reduction, or *reductio per impossible*, properly so called, consists in the following process:—From one of the premisses of the reducend, and the contradictory of its conclusion, new premisses are formed agreeably to a corresponding mood in the first figure; and from these a conclusion is drawn, contradicting the other premiss which is omitted. The reduction is called *indirect*, because it does not positively prove the original conclusion to be true, but merely shows that an absurdity follows the supposition of its being false.

The validity of this process depends on the principle of contradictory opposition, viz., that of contradictory propositions, one is always false, and the other true. If, therefore, the original premisses of the reducend be true, as is always supposed, then a conclusion, which contradicts any of them, must be false; but as that false conclusion is deduced from the new premisses, one of them must also be false, and that must be the contradictory of the original conclusion.

This is the common process by which some imperfect moods are reduced; but it will be found that these moods admit of direct reduction, by means of conversion by negation or contraposition. Thus, reduction may be confined to one kind, direct or ostensive.

In any case, however, all conclusions may be proved by one or other of the two modes, viz., the direct or indirect. The direct mode shows the original conclusion to be true, by arranging the data from which it is deduced in such a way as to show that it results from them necessarily, so that the mind cannot deny the truth of the conclusion, after admitting the truth of the premisses. In the indirect mode, on the other hand, the conclusion is assumed to be false; and thus assumption results in some palpable absurdity, showing, as a necessary consequence, that this assumption must have been false; and hence the conclusion, which was *pro forma*, assumed to be false, must in reality have been true. This latter mode is probably the more forcible and convincing.

In *direct reduction*, the imperfect moods are reduced to the perfect, by various processes of transposition, conversion, or contraposition. These processes are indicated by the principal *consonants*, in the technical words which designate the moods.

1. The initial consonant indicates that the mood expressed by the word is reducible to a mood of the first figure, the name of which commences with the same letter, e. g., all moods designated by words commencing with B, viz., *Baroko*,

Bokardo, *Bramantip*, are reducible to *Barbara ;* those with C, viz., *Cesare*, *Camestres*, *Camenes*, are reducible to *Celarent ;* those with D, viz., *Darapti*, *Datisi*, *Disamis*, *Dimaris*, are reducible to *Darii ;* and those with F, viz., *Festino*, *Felapton*, *Ferison*, *Fesapo*, *Fresison*, are reducible to *Ferio*.

2. The letter M indicates, that in the mood expressed by the name in which it occurs, the premisses must be transposed, so that the major of the reducend becomes the minor in the reduct, and *vice versa*, e. g., in reducing Camestres, of the second figure, to *Celarent* of the first, M shows that the premisses must be transposed, to give them the requisite arrangement. The same process is followed in reducing *Bramantip* to *Barbara*, *Camenes* to *Celarent*, *Disamis* and *Dimaris* to *Darii*.

3. The letters S and P show generally that in reducing the moods expressed by the names in which they occur, the proposition designated by the vowel preceding each must be *converted* in the *reduct*. S denotes simple conversion, and P accidental conversion (conversio per accidens), e. g., in reducing *Cesare*, of the second figure, to *Celarent*, of the first. S shows that the major proposition E is to be converted simply, so as to bring the predicate or middle term to the place of the subject, as in the first figure. Again, in reducing *Felapton*, of the third figure, to *Ferio* of the first, the minor proposition A must be converted per accidens, so as at once to become a particular affirmative, and bring the subject, the middle term, to the place of the predicate, as in the first figure.

4. The letter K indicates that the moods undergo indirect reduction by contradiction or contraposition: by contradiction when the contradictory of the conclusion is substituted for the premiss designated by the vowel after which K is placed ;— by contraposition (or conversion by negation) when the quality of the propositions is changed, so as to bring them to a state in which they may be directly reduced.

It must be remembered that these letters are intended to apply to the vowels which precede, and not to those which follow them.

In reducing syllogisms directly, the process is much more simple in some cases than in others, e. g., *Cesare* and *Festino*, of the second figure, may be reduced to *Celarent* and *Ferio*, by simply converting the major premiss, as may be seen from the annexed examples:—

1. *Cesare.*

No man of honour is addicted to equivocation.
All liars are addicted to equivocation.
No liars are men of honour.

Reduced to *Celarent*—

No man addicted to equivocation is a man of honour.
All liars are addicted to equivocation.
No liars are men of honour.

2. *Festino.*

No man of strict veracity sports with truth.
Some jocose men sport with truth.
Some jocose men are not men of strict veracity.

Reduced to *Ferio*—

No man sports with truth who is of strict veracity.
Some jocose men sport with truth.
Some jocose men are not of strict veracity.

In like manner, *Datisi* and *Ferison*, of the third figure, may be reduced to *Darii* and *Ferio*, by the simple conversion of the minor. Thus—

1. *Datisi.*

All moral agents are responsible for their conduct.

Some moral agents are subject to severe temptations.
Some subject to severe temptations are responsible for their conduct.

Reduced to *Darii*—

All moral agents are responsible for their conduct.
Some subject to severe temptations are moral agents.
Some subject to severe temptations are responsible for their conduct.

2. *Ferison.*

No men addicted to prejudice possess powerful minds.
Some men addicted to prejudice are learned.
Some learned men do not possess powerful minds.

Reduced to *Ferio*—

No men addicted to prejudice possess powerful minds.
Some learned men are addicted to prejudice.
Some learned men do not possess powerful minds.

In reducing *Darapti* and *Felapton*, of the third figure, to *Darii* and *Ferio*, it is merely necessary to convert the minor per accidens. Thus—

1. *Darapti.*

All who assist in the progress of true science deserve the respect of mankind.
All who assist in the progress of true science have to contend with difficulties.
Some who have to contend with difficulties deserve the respect of mankind.

Reduced to *Darii*—

All who assist in the progress of true science deserve the respect of mankind.

Some have to contend with difficulties who assist in the progress of true science.

Some have to contend with difficulties who deserve the respect of mankind.

2. *Felapton.*

No branch of science is altogether perfect.

All branches of science are worthy of diligent culture.

Some things worthy of diligent culture are not altogether perfect.

Reduced to *Ferio*—

No branch of science is altogether perfect.

Some things worthy of diligent culture are branches of science.

Some things worthy of diligent culture are not altogether perfect.

In reducing *Fresison*, of the fourth figure, to *Ferio*, both the major and minor are converted simply—

1. *Fresison.*

No fallacious arguments are legitimate means of persuasion.

Some legitimate means of persuasion fail in convincing.

Some things which fail in convincing are not fallacious arguments.

Reduced to *Ferio*—

No legitimate means of persuasion are fallacious arguments.

Some things which fail in convincing are legitimate means of persuasion.

Some things which fail in convincing are not fallacious arguments.

In reducing *Fesapo*, of the fourth figure, to *Ferio*, the

major is converted simply, and the minor per accidens. Thus—

1. *Fesapo.*

No factious man is truly religious.
All truly religious men are charitable.
Some charitable men are not factious.

Reduced to *Ferio*—

No truly religious man is factious.
Some charitable men are truly religious.
Some charitable men are not factious.

In reducing *Dimaris* and *Camenes*, of the fourth figure, to *Darii* and *Celarent*, the premisses are transposed, and the conclusion converted simply. Thus—

1. *Dimaris.*

Some learned men are egotistical.
All egotistical men are fond of popularity.
Some fond of popularity are learned men.

Reduced to *Darii*—

All egotistical men are fond of popularity.
Some learned men are egotistical.
Some learned men are fond of popularity.

2. *Camenes.*

All useful studies are worthy of encouragement.
Nothing worthy of encouragement is injurious to the morals.
Nothing injurious to the morals is a useful study.

Reduced to *Celarent*—

Nothing worthy of encouragement is injurious to the morals.
All useful studies are worthy of encouragement.
No useful study is injurious to the morals.

In reducing *Camestres*, of the second figure, to *Celarent*, the premisses are transposed, and the minor and conclusion converted simply. Thus—

Camestres.

Every man of sense is anxious to gain useful information.
No idle man is anxious to gain useful information.
No idle man is a man of sense.

Reduced to *Celarent*—

No person who is anxious to gain useful information is an idle man.
Every man of sense is anxious to gain useful information.
No man of sense is an idle man.

In reducing *Disamis*, of the third figure, to *Darii*, the premisses are transposed, and the major and conclusion converted simply. Thus—

Disamis.

Some poets prefer sound to sense.
All poets dislike to be severely criticised.
Some who dislike to be severely criticised prefer sound to sense.

Reduced to *Darii*—

All poets dislike to be severely criticised.
Some who prefer sound to sense are poets.
Some who prefer sound to sense dislike to be severely criticised.

In reducing *Bramantip*, of the fourth figure, to *Barbara*, the premisses are transposed, and the conclusion converted per accidens. Thus—

Bramantip.[a]

All blasphemous writers injure the public morals.

[a] The reason why in this mood the conclusion may be accidentally converted is, that the major term has been distributed in the major premiss, and therefore is *distributable* in the conclusion, although, owing to the figure, it cannot *be* distributed, for a term should not be distributed in the conclusion, if it has not been distributed in its premiss; and it should be remembered also, that a term ought not to be undistributed in the conclusion, if it has been undistributed in its premiss.

All who injure the public morals deserve punishment.
Some who deserve punishment are blasphemous writers.

Reduced to *Barbara*—

All who injure the public morals deserve punishment.
All blasphemous writers injure the public morals.
All blasphemous writers deserve punishment.

The following table presents summarily the various processes by which imperfect Moods are reduced to perfect:—

REDUCENDS.	REDUCTS.	PROCESSES.
Cesare.....	Celarent.....	Major premiss converted simply.
Camestres.....	Celarent.....	Premisses transposed. Minor and conclusion converted simply.
Festino.....	Ferio.....	Major converted simply.
Darapti.....	Darii.....	Minor converted per accidens.
Disamis.....	Darii.....	Premisses transposed. Major and conclusion converted simply.
Datisi.....	Darii.....	Minor converted simply.
Felapton.....	Ferio.....	Minor converted per accidens.
Ferison.....	Ferio.....	Minor converted simply.
Bramantip.....	Barbara.....	Premisses transposed. Conclusion converted per accidens.
Camenes.....	Celarent.....	Premisses transposed. Conclusion converted simply.
Dimaris.....	Darii.....	Premisses transposed. Conclusion converted simply.
Fesapo.....	Ferio.....	Major converted simply. Minor per accidens.
Fresison.....	Ferio.....	Major and Minor converted simply.

Examples of all the Moods in the three last figures (except Baroko and Bokardo) converted to the corresponding figures of the first:—

SECOND FIGURE.		FIRST FIGURE.
Cesare		*Celarent*
No planet is fixed.....	*convert simply*	No fixed body is a planet.
Every star is fixed.....	*as it is*	Every star is fixed.
No star is a planet.....	*as it is*	No star is a planet.
Camestres		*Celarent*
Every star is fixed.....	*transpose the premisses, and simply convert the minor*	No fixed body is a planet.
No planet is fixed.....		Every star is fixed.
No planet is a star.....	*convert simply*	No star is a planet.
Festino		*Ferio*
No planet is a sun	*convert simply*	No sun is a planet.
Some luminous bodies are suns.....	*as it is*	Some luminous bodies are suns.
Some luminous bodies are not planets.....	*as it is*	Some luminous bodies are not planets.

THIRD FIGURE.		FIRST FIGURE.
Darapti		*Darii*
All flowers are beautiful....	*as it is*	All flowers are beautiful.
All flowers are deciduous...	*convert particularly*	Some deciduous things are flowers.
Some deciduous things are beautiful.....	*as it is*	Some deciduous things are beautiful.
Disamis		*Darii*
Some flowers are deciduous	*transpose and simply convert the major*	All flowers are beautiful.
All flowers are beautiful....		Some deciduous things are flowers.
Some beautiful things are deciduous.....	*convert simply*	Some deciduous things are beautiful.
Datisi		*Darii*
All flowers are beautiful.....	*as it is*	All flowers are beautiful.
Some flowers are plants.....	*convert simply*	Some plants are flowers.
Some plants are beautiful..	*as it is*	Some plants are beautiful.
Felapton		*Ferio*
No star is dark	*as it is*	No star is dark.
All stars are distant.....	*convert particularly*	Some things distant are stars.
Some things distant are not dark.....	*as it is*	Some things distant are not dark.
Ferison		*Ferio*
No star is dark	*as it is*	No star is dark.
Some stars are unseen.....	*convert simply*	Some unseen things are stars
Some things unseen are not dark.....	*as it is*	Some unseen things are not dark.

FOURTH FIGURE.		FIRST FIGURE.
Bramantip		*Barbara*
Every precious stone is a gem..	*transpose the premisses*	Every gem is brilliant.
Every gem is brilliant.....		Every precious stone is a gem.
Some brilliant stones are precious.....	*change to universal*	All precious stones are brilliant.

Camenes

Every star is a fixed body... } *transpose the*
No fixed body is a planet.... } *premisses*
No planet is a star..... *convert simply*

Celarent

No fixed body is a planet.
Every star is a fixed body.
No star is a planet.

Dimaris

Some luminous bodies are comets..... } *transpose*
All comets are irregular planets..... } *transpose*
Some irregular planets are luminous bodies..... } *convert simply*

Darii

All comets are irregular planets.
Some luminous bodies are comets.
Some luminous bodies are irregular planets.

Fesapo

No falling body is a star.... *convert simply*
All stars are luminous..... *convert partic.*
Some luminous bodies are not falling bodies..... } *as it is*

Ferio

No star is a falling body.
Some luminous bodies are stars
Some luminous bodies are not falling bodies.

Fresison

No fixed body is a comet... *convert simply*
Some comets are luminous *convert simply*
Some luminous bodies are not fixed } *as it is*

Ferio

No comet is a fixed body.
Some luminous bodies are comets.
Some luminous bodies are not fixed bodies.

SECTION III.

Reductio per impossible, or ad Absurdum.

This species of reduction, as already partially explained, consists in the hypothetical falsehood of that which is under discussion; and in the tracing of such a concession to its legitimate consequences, with the view of proving that what was hypothetically conceded as false, involves some palpable impossibility or absurdity.

This kind of reduction is usually confined to the moods *Baroko* of the second, and *Bokardo* of the third figure. It is equally applicable, however, to any of the three last figures, as will be shown by examples. But let us, in the first place, take *Baroko* and *Bokardo*.

In reference to Baroko and Bokardo, it is necessary to remark that the contradictory of the conclusion must be substituted for the *particular negative* premiss, while the universal premiss retains its original place. In other moods reducible in this way, the contradictory of the conclusion must be substituted for the major or minor premiss, as the requirements of a syllogism in the first figure may render such substitution necessary.

1. *Baroko.*

BA—All truly wise men live virtuously.

ROK—Some philosophers do not live virtuously; therefore,

O.—Some philosophers are not truly wise men.

If instead of the minor (a particular negative) we substitute the contradictory of the conclusion, viz.,

All philosophers are truly wise men,

the middle term will be universally affirmed of the major in the major proposition, while in the new minor proposition it will be affirmed that the whole minor term is contained in the major, and by the Dictum de omni the conclusion will follow that the middle term is affirmed of the whole minor. By thus substituting the contradictory of the conclusion, in place of the minor (a particular negative), the syllogism will stand thus—

Barbara.

BAR—All truly wise men live virtuously.

BA—All philosophers are truly wise men; therefore,

RA.—All philosophers live virtuously.

The conclusion of the reduct is the contradictory of the original minor premiss of the reducend, and must be false, since the premisses of the reducend were supposed to be true; and therefore one of the premisses of the reduct, from which the conclusion has been legitimately deduced, must also be false. But as the major proposition is one of the original premisses granted to be true, the falsity must be in the *minor*, viz., the contradictory of the original conclusion, which proves the original conclusion to be true.

2. *Bokardo.*

BO—Some kinds of money have not intrinsic value.

KAR—All kinds of money have adventitious value.

DO.—Some things having adventitious value have not intrinsic value.

If in place of the negative premiss (the major), we substitute the contradictory of the conclusion, viz.—

All things having adventitious value have intrinsic value.

We shall have the following syllogism in Barbara, viz.—

All things having adventitious value have intrinsic value.
All kinds of money have adventitious value.
All kinds of money have intrinsic value.

This new conclusion must be *false*, because it contradicts the major premiss of the reducend; therefore the substituted major premiss, from which the conclusion of the reduct is drawn, must be false, and consequently its contradictory (the conclusion of the reducend) must be true.

But although the moods Baroko and Bokardo are usually reduced, by *reductio per impossible*, to Barbara, they may also be *ostensively* reduced by contraposition or negation—the first to *Ferio*, and the second to *Darii*. Let the following syllogism be in Baroko:—

Every true patriot is a friend to religion.
Some great statesmen are not friends to religion.
Some great statesmen are not true patriots.

In order to reduce this syllogism to Ferio, we first convert the major premiss by negation, and then render the minor premiss affirmative, by combining the negative particle with the predicate. Thus—

He-who-is-not-a-friend-to-religion is not a true patriot.
Some great statesmen are not-friends-to-religion.
Some great statesmen are not true patriots.

In like manner, Bokardo may be reduced to Darii. Let the following syllogism be in Bokardo:—

Some systems of unjust exaction have not been followed by immediate punishment.

All systems of unjust exaction incur guilt.

Some things which incur guilt have not been followed by immediate punishment.

In reducing this example to Darii, we first transpose the premisses, and next convert the major by contraposition. Thus—

All systems of unjust exaction incur guilt.

Some things which have not been followed by immediate punishment are systems of unjust exaction; therefore,

Some things which have not been followed by immediate punishment incur guilt.

It has been stated above, that the moods in the three last figures may be reduced to the first by the *reductio per impossible*, as well as Baroko and Bokardo. To assist the learner in the way in which this may be done, the following example is annexed:—

Let the mood to be reduced be in Disamis, of the third figure.

This mood is represented by the vowel symbols, IAI. If this conclusion I is false, its contradictory E, must be true; for of contradictories one must be false, and the other true. Now, this assumed contradictory E contradicts the major premiss I. If we substitute this contradictory for I, the new premisses will be EA, from which we can legitimately deduce the conclusion E, and the new mood will be Celarent of the first figure. The falsity involved in this assumed contradictory will be best illustrated by examples of the reducend and reduct:—

DI—Some infidels publish their opinions.

SA—All infidels are opposed to true religion.

MIS.—Some beings opposed to true religion publish their opinions.

This syllogism, when reduced *per impossible*, is as follows :—

cE—No beings opposed to true religion publish their opinions.
lA—All infidels are opposed to true religion.
rEnt.—No infidels publish their opinions.

In this reduction the conclusion of the reducend was assumed to be *false*, and its contradictory assumed to be *true*, and from the contradictory assumed to be true, united to the minor premiss of the reducend, a new conclusion was drawn; but this conclusion is obviously false, because it contradicts the major premiss of the reducend, which was assumed to be true. Hence it must follow, that the contradictory of the reducend (which was assumed true) is in reality false; and hence the conclusion of the reducend must itself be true.

It has been observed, that in reducing the moods Baroko and Bokardo *per impossible*, the assumed or new conclusion directly contradicts an original premiss of the reducend. In the other moods, however, which may be reduced in this way, the assumed or new conclusion will not in every instance directly contradict an original premiss of the reducend. The contradicted premiss may be one deducible from the original proposition, or its simple or accidental converse; for by the laws of conversion, if a proposition is true, the particular contained under it is true, and so also is its simple or accidental converse; and the contradiction of any of these will prove that the original conclusion cannot be false, equally as well as if the original premiss were itself contradicted.

OF COMPOUND PROPOSITIONS.

Compound propositions[a] have been variously classified, but,

a The curious in compound propositions are referred to Dr Kirwan's Logic, vol. I., where they will find the subject as amply and satisfactorily treated as anywhere.

generally speaking, with questionable success. This has chiefly arisen from an undue multiplication of names, founded on distinctions comparatively non-essential. Many of them are now very properly disappearing from logical treatises, and all intended here is a mere enumeration.

1. *Copulative Propositions.*

A copulative[a] proposition is one which has its subjects or predicates joined by copulative or negative particles.

A proposition of this kind may have several subjects, and but one predicate; as,

Cæsar and Pompey were great generals.

Neither gold nor silver will purchase immortality.

Or several predicates, and but one subject; as,

Cæsar was a great and a fortunate general.

Or several subjects and several predicates; as,

Cato, Varro, Cicero, and Seneca cultivated logic, physics, metaphysics, and ethics.

When the connecting particle is *and*, the proposition is a copulative affirmative; but when the particle is *not, neither*, &c., the proposition is a copulative negative.

A copulative affirmative is false, if any of the parts is false; for the truth of such a proposition depends on the truth of all its parts. The proposition,

The earth and moon revolve round the sun,

would be false if the predicate, 'revolve round the sun,' did not apply to both. On the other hand, a copulative negative is false, if either of the parts is true; as,

Virtue and riches are not necessary to salvation.

[a] The number of simple propositions into which a copulative may be resolved is determined by multiplying the number of subjects into that of the predicates. — *Thynne.*

2. *Disjunctive Propositions.*

A disjunctive proposition is one in which the whole subject is said to be contained in two or more predicates, connected by a disjunctive particle, e. g.—

All wars are either just or unjust.

Every animal is either rational or irrational.

The parts of a disjunctive proposition are always affirmative in quality, and the proposition is true, if any of its parts is true, e. g.—

The true religion is either the Mahometan, or Jewish, or Christian.

But if it can be shown that none of the parts is true, the proposition is false; as,

The true religion is either the Mahometan or Jewish.

The truth of a disjunctive proposition depends on the necessary opposition of the parts; for since a division is made in every disjunctive proposition, it must be subject to the rules of logical division. The predicates are the parts into which the whole subject is divided; and it is therefore necessary that the predicates taken together should contain no more and no less than the whole subject. Thus—

The teeth are either incisors, canine, bicuspid, or molar.

3. *Conditional Propositions.*

A conditional[a] proposition is one in which the assertion is made under a condition.

[a] In the scheme of division and subdivisions of propositions laid down (p. 104), the usual method was followed of dividing *hypothetical* propositions into *conditional* and *disjunctive;* the matter not appearing of such importance as to render any alteration in the ordinary scheme necessary. But as it is not intended to treat either of hypothetical propositions or syllogisms separately, but to employ both as synonymous with the *conditional,* it may be necessary to state that a division of hypothetical propositions into conditional and disjunctive, is illogical, for hypothetical and conditional propositions are identical in sense,

The part, or branch of the proposition in which the condition occurs, is called the *antecedent*, and the part or branch which follows from it the *consequent*. The connection between them is called the *consequence*.

The antecedent and consequent cannot always be distinguished by their order. The antecedent is that which must have the conditional particle prefixed, and may be distinguished in this way, although it should follow the consequent in the verbal arrangement of a sentence.

In a conditional proposition, there is no absolute assertion made as to the truth of either the antecedent or consequent. The conditions are, that if the antecedent is true, the consequent must be true; in other words, that if the antecedent is granted, the consequent may be inferred. Hence if there be a *vis consequentiæ* in the inference, the proposition will be true, though one or both of the parts be false, e. g.—

If there be no providence, there will be no future state.

In this proposition both antecedent and consequent are false; yet the proposition, as a whole, is true, for the consequent follows from the antecedent. But, on the other hand, both of the parts may be true, and the proposition itself false, if there be no *vis consequentiæ*, e. g.—

If Cicero was a Roman, he was a patriot.

and differ only to the extent of being names appropriated from different languages; so that in the division referred to, the name of a genus is confounded with that of a species. It may be mentioned, also, that this division has not even the sanction of authority; for Boethius, the chief authority on this point, employs indifferently the terms *hypotheticus*, *conditionalis*, *non simplex*, for the genus, and as opposed to *categoricus* or *simplex*.—[See *Ed. Rev.*, vol. lvii., p. 219.] Mr Mansel is of opinion, that 'with reference to modern usage, it will be better to contract the Greek word than to extend the Latin one;' and therefore uses the term *hypothetical* as synonymous with *conditional*. It may be necessary to inform the learner also, that hypotheticals, in the present acceptation of the term, are not treated of by Aristotle. They were first sketched by Theophrastus, and afterwards more fully developed by Eudemus and the Stoics. —[See *Mansel*, App. p. 57.]

Here both of the parts are true; yet as the latter does not follow from the former, the proposition, as a whole, is false.

The rules of conditional propositions are three—

1. If the antecedent is granted, the consequent may be inferred.
2. If the consequent is denied, the antecedent may be denied.
3. Nothing can be inferred either from taking away the antecedent, or granting the consequent.

This arises from the circumstance, that the same consequent may follow from another antecedent, although not from that from which it is sought to be inferred in some particular instance.

4. *Adversative Propositions.*

An adversative proposition is one in which the parts are joined by an adversative particle; as, *but*, *yet*, &c., e. g.—

Travellers may change their climate, but not their dispositions.

Hannibal was a great general, yet finally unfortunate.

The only difference between a copulative and an adversative proposition is, that the adversative particle implies some degree of contrariety; for if we say,

Anacharsis was a Scythian and a philosopher,

the proposition is a copulative one; but if we say,

Anacharsis was a Scythian, yet a philosopher,

the proposition is adversative, as it indicates that the terms 'Scythian' and 'philosopher' are not generally predicates of the same subject.

Adversative propositions are sometimes called *discretives.*

5. *Relative Propositions.*

A relative proposition is one whose parts are connected by a particle expressing relation; as,

Books are valuable, in so far as they are useful.

6. *Causal Propositions.*

A causal proposition is one whose parts are connected by a particle asserting that one of them *is* the cause of the other; as,

Cæsar defeated Pompey, because his army was better disciplined.

Or indicating that one of them *is not* the cause of the other; as,

All events are necessary, because they were decreed by fate.

A causal proposition is contradicted by denying the causation.

7. *Comparative Propositions.*

A comparative proposition is one which expresses the agreement or disagreement of a predicate and subject with each other in a greater or less degree; as,

The Greeks were more polished than the Romans.

The Christian religion is preferable to the Mahometan.

8. *Exclusive Propositions.*

An exclusive proposition is one which asserts that the predicate so agrees with the subject as to agree with it only;[a] as,

Victoria alone is Queen of England.

The Platonists were the only school of philosophers who maintained the immortality of the soul.

[a] There is a difference between the words *alone* and *only*, for 'only' implies that there is no other of the same kind, while 'alone' imports being unaccompanied with any other.

Exclusive propositions are false, if the predicate does not agree with the subject, or if it agrees with more subjects than one.

9. *Exceptive Propositions.*

An exceptive[a] proposition is one which expresses the agreement or disagreement of the subject with the predicate, except in some part of it; as,

All except the wise men are mad.
All but the pious are foolish.

The falsehood of an exceptive proposition is shown in the same way as in an exclusive.

10. *Inceptive and Desitive Propositions.*

Inceptive and desitive[b] propositions are those in which something is said to begin or end; as,

After the death of the Gracchi, Rome ceased to be free.

SECTION IV.

CONDITIONAL SYLLOGISMS.

A syllogism is said to be conditional when either its major or minor premiss is expressed under a condition, or both the major and minor.

[a] An exclusive proposition may be changed into a synonymous exceptive, and in the change the subject of the exclusive becomes the excepted part of the exceptive. If the exclusive be affirmative, the exceptive will be negative, and *vice versa*, for an affirmative exclusive asserts that the predicate agrees with the subject alone, which is the same thing as to say, that the predicate disagrees with all except that subject; and this is a negative exceptive. Thus the exclusive—'Men are the only animals that reason'—when expressed in the form of an exceptive, will be, 'No animals but men reason.'—*Walker*, p. 80.

[b] An inceptive becomes desitive by using the desitive verb for the inceptive, and instead of the state after, the change declaring the state before, and similarly the desitive may become inceptive.—*Walker*, p. 80.

Conditional syllogisms are consequently of three kinds :—

1. When one of the premisses is conditional, and the conclusion absolute. In this case the major must be the conditional proposition.

2. When one of the premisses is conditional and the conclusion conditional. In this case the minor must be the conditional proposition.

3. When both major and minor propositions are conditional. In this case the conclusion must also be conditional.

When the major proposition is alone conditional, the conclusion is absolute, for this reason, that in the minor the part which asserts or denies the condition is put absolutely, and thus prevents the condition from entering the conclusion.

In conditional syllogisms of this kind, legitimate conclusions may be obtained in two ways :—

1. From the position of the antecedent to the position of the consequent, e. g.—

If the Christian miracles are credible, the Christian doctrines are true;

But the Christian miracles are credible; therefore,

The Christian doctrines are true.

In this example we proceed from the position of the antecedent to the position of the consequent. An argument of this kind is said to be *constructive*, or as it is technically termed in the *modus ponens*.

2. From the remotion of the antecedent to the remotion of the consequent, e. g.—

If Atheists are in the right, then the world exists without a cause;

But the world does not exist without a cause; therefore,

Atheists are not in the right.

In this example we proceed from the remotion of the consequent to the remotion of the antecedent. An argument of

this kind is said to be *destructive*, or, as it is technically termed, in the *modus tollens*.

The conclusiveness of each of these processes of reasoning is obvious. In the former example it is asserted in the major, that the consequent follows from the antecedent, and consequently, if the antecedent be true, the consequent must be true. In the latter example, the consequent is denied, or, in other words, is not true; and hence the antecedent from which it follows cannot be true.

In examples like the foregoing, where the major alone is conditional, we must consider the minor as the true proposition, for it is *absolutely* posited; and the conclusion, therefore, depends for its truth on the truth of the minor.

It may be remarked, that the removal of the antecedent or consequent does not merely signify the *denial* of it; but the *contradiction*[a] of it, for the mere denial of it by a *contrary* proposition, will not make a true syllogism, e. g.—

If every creature is reasonable, every brute is reasonable;
But no brute is reasonable; therefore,
No creature is reasonable.

But if we put the minor in this form, viz.,

Every brute is not reasonable,

then it will follow legitimately in the conclusion, that

Every creature is not reasonable.

It may be remarked, also, that when the antecedent and consequent are *negative*, they are removed by an affirmative, as—

If there be no God, then the world does not exhibit creative wisdom;

[a] If the absolute premiss assert the falsehood of the consequent, we must take care to make the conclusion the *contradictory*, not the *contrary* of the antecedent. For we can only infer that the antecedent is false, but are not thence warranted to assert the truth of its contrary.—*Walker's Commentary*.

But the world does exhibit creative wisdom; therefore,
There is a God.

But while, in conditional syllogisms of this description, there are two legitimate modes of reasoning, there are also two illegitimate modes,—

1. When we proceed from the remotion of the antecedent to the remotion of the consequent.

In illustration, let us take the following example:—

If Mahometanism be true, idolatry is sinful;
But Mahometanism is not true; therefore,
Idolatry is not sinful.

It is clear that in this example we cannot proceed from the remotion of the antecedent to the remotion of the consequent, for the sinfulness of idolatry is not affected by the truth or non-truth of Mahometanism.

2. When we proceed from the position of the consequent to the position of the antecedent.

In illustration, let us take the following example:—

If states have great standing armies, they are powerful.
But this state is powerful; therefore,
This state has great standing armies.

It is obvious that in this example we cannot proceed from the position of the consequent to the position of the antecedent for great standing armies do not necessarily prove the internal power of a state.

When the subject of the antecedent and consequent is the same, a conditional syllogism may be changed into a categorical one, e. g.—

If Cæsar be a king, he must be honoured;
But Cæsar is a king; therefore,
He must be honoured;

and this syllogism may be changed into a categorical, thus,

Every king must be honoured;
But Cæsar is a king; therefore,
He must be honoured.

It has been stated above that when the major alone is conditional, the conclusion is absolute or categorical; but when the minor is conditional, the conclusion is conditional, e. g.—

The worshippers of images are idolaters.
If the Romanists worship a crucifix, they are worshippers of an image; therefore,
If the Romanists worship a crucifix, they are idolaters.

Syllogisms in which both the major and minor propositions are conditional, are best suited to a conditional or hypothetical sorites.

DISJUNCTIVE SYLLOGISMS.

A disjunctive syllogism is one whose major premiss is disjunctive, and affirmative in quality.

The parts of a disjunctive syllogism are assumed to contain all the possible assertions that can be made regarding the subject.

1. The major premiss must consist of at least two members. In this case the minor either asserts the one and the conclusion denies the other, or the minor denies the one and the conclusion asserts the other.

In a disjunctive syllogism, therefore, we either draw a conclusion from the position of one part to the remotion of the other, or from the remotion of one part to the position of the other, e. g.—

The objects in nature either had a commencement, or they are self-existent;
But they had a commencement; therefore,
They are not self-existent.

In this example we draw a conclusion from the position of one part to the remotion of the other.

Again,

The objects in nature are either self-existent, or were created by a self-existent being;

But they are not self-existent; therefore,

They were created by a self-existent being.

In this example we draw a conclusion from the remotion of the one part to the position of the other.

2. When the major consists of more than two members, either the minor denies some one of them, and the conclusion asserts the truth of the rest, or the minor asserts the truth of some one of them, and the conclusion denies the rest, e. g.—

All virtues are either faculties, passions, or habits;

But the virtues are neither faculties nor passions; therefore,

The virtues are habits.

In this example the minor denies two of the suppositions, and the conclusion asserts the truth of the third.

Again,

The sciences arose either from intuition, inspiration, or experience;

But they arose from experience; therefore,

The sciences did not arise from intuition or inspiration.

In this example the minor asserts or posits the truth of one of the suppositions, and the conclusion denies the other two.

Disjunctives may be resolved into conditionals, by altering the form of the major premiss, i. e., changing the disjunctive particles into conditional, e. g.—

The objects in nature are either eternal, or the results of chance, or the effects of intelligent agency;

But they are neither eternal, nor the results of chance; therefore,

They are the effects of intelligent agency.

This example, reduced to the conditional form, is as follows:—

If the objects in nature are neither eternal, nor the results of chance, they are the effects of intelligent agency;

But they are neither eternal nor the results of chance; therefore,

They are the effects of intelligent agency.

Here the same minor and conclusion equally apply.

SECTION V.

OF THE DILEMMA.

The dilemma[a] is a conditional syllogism, with a disjunctive antecedent or consequent. It partakes both of the conditional and disjunctive argument.

In the conditional premiss of a dilemma, either the antecedent or consequent may be disjunctive.

A dilemma may prove either an affirmative or negative conclusion.

When an affirmative is proved, the dilemma is said to be in the *modus ponens;* when a negative is proved, it is said to be in the *modus tollens;* when the conclusion is in the modus ponens, the argument is said to be *constructive;* and

[a] The word dilemma means 'double proposition;' so that the whole argument takes its name from the one mixed judgment in it. When this is *more* than double, as in, 'If a prisoner is legally discharged, either the magistrate must refuse to commit, or the grand jury ignore the will, or the common jury acquit, or the crown exercise the prerogative of pardon,' the argument has been called a trilemma, tetralemma, or polylemma, according to the number of members the judgment may have.—*Outlines of the Laws of Thought*, p. 286.

when in the modus tollens, *destructive.* A dilemma is said to be *simple* when it concludes categorically, and *complex* when its conclusion is disjunctive.

A dilemma is an argument by which we endeavour to prove the absurdity or falsehood of some assertion. With this view, a conditional proposition is assumed, the antecedent of which is the assertion to be disproved, while the consequent is a disjunctive proposition, enumerating all the possible suppositions upon which the assertion contained in the antecedent can be true. Should all the suppositions contained in the consequent be rejected, it must follow that the antecedent must also be rejected. If, therefore, a proposition of which the antecedent is conditional, and the consequent disjunctive, be the major of a syllogism, and if the minor deny all the suppositions enumerated in the consequent, it will follow necessarily that the conclusion must deny the antecedent.

In the strictest form of the dilemma, it is supposed that some one of the antecedents must be true, or some one of the consequents false; but without determining which of them is so. The name dilemma also refers to the circumstance, that the major, in stating the argument, presents two suppositions or cases from each or both of which the same conclusion may be drawn.

Certain kinds of dilemmas require, as will be seen from the following examples, that the denial of each branch of the consequent must be proved in the minor by a prosyllogism, e. g.—

If there are two independent first principles, the one good and the other evil, either the one is more powerful than the other, or they are equal in power.[a]

But the one is not more powerful than the other; (for if it it were, it would entirely prevent the other from having any

[a] Arthur's Essay on 'Evils and their Causes.'

share in the production or government of the universe: and therefore everything would be either absolutely good or absolutely evil.) Neither are they equal in power; (for if they were, but had opposite wills, they would counterbalance each other, and therefore produce nothing.)

Therefore, there are not two independent first principles, the one good and the other evil.

In this dilemma, the antecedent is the assertion to be disproved by remotion. All the suppositions enumerated in the disjunctive part of the major, on which the antecedent could be tenable, are removed in the minor by means of proofs prosyllogistically attached; and, as a necessary consequence, the conclusion rejects the antecedent.

This dilemma may be reduced to the two following conditional syllogisms:—

1. If there are two independent first principles, the one more powerful than the other, everything would either be absolutely good or absolutely evil.

But the present is not the case of everything being either absolutely good or absolutely evil.

Therefore, there cannot be two independent first principles, the one more powerful than the other.

2. If there are two independent first principles, equal in power but of opposite wills, they must counterbalance each other, and produce nothing.

But the present is not the case of nothing being produced.

Therefore, there are not two independent first principles equal in power, but of opposite wills.

The following example is of a simpler character:—

If perfect virtue exists, it exists either among civilised or among uncivilised communities.

But perfect virtue cannot exist among civilised communities; (for civilisation produces only a spurious kind of

virtue, inclining rather to expediency than rectitude.) Neither can it exist among uncivilised communities; (for the actions of savages are regulated by narrow selfishness, which is incompatible with perfect virtue.)

Therefore, perfect virtue does not exist.

The *simple constructive* dilemma has a major premiss, containing several antecedents, with one *common* consequent, and a minor which grants these antecedents disjunctively, i. e., grants some one of them, e. g.—

If the heavenly inhabitants have either no desires, or have these fully gratified, they are perfectly happy.

But they either have no desires, or have them fully gratified.

Therefore, they are perfectly happy.

If a Christian be living, he is the Lord's servant; and if he be dead, he is the Lord's servant.

But he must be always either living or dead.

Therefore, he is always the Lord's servant.

In a constructive dilemma, some one of the antecedents is assumed to be true; and in a destructive, some one of the consequents is assumed to be false, but *which* is left undetermined.

The *complex constructive* dilemma has a major premiss, containing several antecedents, each with a *different* consequent, and a minor which grants the antecedents disjunctively; while the conclusion infers the consequents disjunctively, i. e., determines one of them to be true, e. g.—

If the evangelists speak truth, Christianity is of God; and if they do not speak truth, the existence of Christianity is unaccountable.

But the evangelists either do or do not speak truth.

Therefore, Christianity is either of God, or its existence is unaccountable.

The *destructive*[a] dilemma has a major, containing several antecedents, each with a different consequent, and a minor denying the consequents disjunctively; while the conclusion also disjunctively denies the antecedents, e. g.—

If men were wise, they would avoid speaking irreverently of sacred things, even in jest; and if they were good, they would avoid doing so in earnest.

But many do not avoid this, either in jest or earnest.

Therefore, many are either not wise or not good.

If a witness be an honest one, he will not bear false testimony designedly; and if he be a competent one, he will not do so undesignedly.

But a witness who speaks false, does so either designedly or undesignedly.

Therefore, he is either not honest or not competent.

The facility with which a destructive dilemma may be reduced to two conditional syllogisms, may be seen from the following example, viz.,—

If this man were prudent, he would behave well for his own sake; and if he were benevolent, he would behave well for the good of others.

But he does not behave well, either for his own sake or the good of others.

Therefore, he is neither prudent nor benevolent.

1.

If this man were prudent, he would behave well for his own sake.

[a] Whateley and others seem to be of opinion, that a destructive dilemma, properly so called, should, like the complex constructive, have a disjunctive minor premiss; and this they term the only true form of the destructive dilemma. In point of fact, however, the *simple* destructive is a still more common form, and any arguments adduced against it will equally apply to the simple constructive.

But he does not behave well for his own sake.

Therefore, he is not prudent.

2.

If this man were benevolent, he would behave well for the good of others.

But he does not behave well for the good of others.

Therefore, he is not benevolent.

A dilemma may become invalid in one or other of three ways.

1. When the members of the division in the disjunctive part of the major are not adequate to the whole divided; in other words, when they do not enumerate all the possible suppositions, e. g.—

If a writer is to be accounted original, it must either be in virtue of innate ideas, or of thoughts taken from other authors.

But a writer cannot be accounted original in virtue of innate ideas; (for if ideas are innate, they are common to men in general;) neither can he be accounted original, if his thoughts are taken from other authors; (for in this case he is a plagiarist.)

Therefore, in no case can a writer be accounted original.

In this example, it is evident that in the disjunctive part of the major an alternative is omitted, viz., that a writer may have ideas which are peculiarly the product of his own intellect, and which consequently are neither innate nor taken from other writers.

If Abraham were justified, it must have been either by faith or by works.

Now he was not justified by faith (according to James,) nor by works (according to Paul.)

Therefore Abraham was not justified.

In this example the alternative—*by faith and works conjointly* is omitted.[a]

2. If the prosyllogistic proof is insufficient to prove the minor, e. g.—

If the soul be annihilated, it must be by something which is in existence, or something which is not.[b]

But that which is in existence can never produce what is physically contrary to itself; and that which has no existence, cannot act.

Therefore, the soul cannot be annihilated.

That the proof of the minor fails will be readily seen by reducing the argument to two conditional syllogisms; thus—

1.

If the soul can be annihilated by something which exists, that something must produce what is physically contrary to itself.

But no existence can produce what is physically contrary to itself.

Therefore, the soul cannot be annihilated by anything which exists.

2.

If the soul can be annihilated by something which does not exist, that something must act.

But that which does not exist cannot act.

Therefore, the soul cannot be annihilated by that which does not exist.

Two objections may be made to the part of the minor, which asserts that what is in existence cannot produce anything physically contrary to itself. 1. The asserted impos-

[a] Considering logic as a formal science, the supplying of an omitted alternative is a *material*, not a *logical* merit.

[b] Drew's Essay on the Immortality of the Soul.

sibility is merely an assumption; and, 2. If the Omnipotent can create out of nothing, a greater exertion of power is not required to annihilate what has been so created.

But to take a simpler example, viz.—

If a man study metaphysics, he must either follow implicitly some existing works on the subject, or he must trace the workings of his own mind.

But if he follows implicitly some existing works on the subject, he must take his knowledge from authority; and if he traces the workings of his own mind, he will involve himself in inextricable confusion.

Therefore, he must either take his knowledgefrom auth o-rity, or involve himself in inextricable confusion.

In this argument the second alternative does not hold true; for a man may trace the workings of his own mind without involving himself in inextricable confusion.

3. A dilemma ought to be incapable of being retorted.

The retortibility of a dilemma is rather a mark by which we may conclude it to be fallacious, than any distinct circumstance of invalidity.

The following example is, in substance, taken from one of Cicero's letters to a provincial dignitary who had upbraided him for negligence in his correspondence.

If your letters have ceased, you have either become lazy, or you do not value my friendship, or you have forgotten me.

But your letters have ceased.

Therefore, you have either become lazy, or you do not value my friendship, or you have forgotten me.

This dilemma is vitiated by an illogical distribution of the major premiss for the supposition, '*or your attention is otherwise engrossed*,' is omitted. Instead of pointing out the logical inaccuracy, Cicero retorts the dilemma, as they were both equally dilatory in their correspondence.

There is a well-known ancient example of a retortible dilemma mentioned by Aulus Gellius, and generally quoted by logicians, which may be added:—'Euathlus, a rich young man, desirous of learning the art of pleading, applied to Protagoras, a celebrated sophist, to instruct him, promising a great sum of money as his reward, one-half of which was paid down, the other half he bound himself to pay as soon as he should plead a cause before the judges and gain it. Protagoras found him a very apt scholar; but after he had made good progress, he was in no haste to plead causes. The master, conceiving that he intended, by these means, to shift off his second payment, took, as he thought, a sure method of getting the better of his delay. He sued Euathlus before the judges; and, having opened his cause at the bar, he pleaded to this purpose:—"O most foolish young man, do you not see that, in any event, I must gain my point? for, if the judges give sentence for me, you must pay by their sentence; if against me, the condition of our agreement is fulfilled, and you have no plea left for your delay, after having pleaded and gained a cause." To which Euathlus answered, "O most wise master, I might have avoided the force of your argument by not pleading my own cause. But, giving up this advantage, do you not see that, whatever sentence the judges pass, I am safe? If they give sentence for me, I am acquitted by their sentence; if against me, the condition of our agreement is not fulfilled by my pleading a cause and losing it."'

The dilemma, as used by Protagoras, may be thus stated:—

Either the cause will go on my side, or on yours.

If the cause goes on my side, you must pay me according to the sentence of the judge; if the cause goes on your side, you must pay me according to your bargain.

Therefore, whether the cause goes for me or against me, you must pay me the reward.

Euathlus retorted the dilemma thus:—

Either I shall gain the cause, or lose it.

If I gain the cause, then nothing will be due to you, according to the sentence of the judge; but if I lose the cause, nothing will be due to you, according to my bargain.

Therefore, whether I gain or lose the cause, I will not pay you, for nothing will be due to you.[a]

SECTION VI.

OF THE ENTHYMEME.[b]

A very prevalent error, regarding the nature of the enthymeme, is, that it is a syllogism with one premiss suppressed,

[a] This story is by the Greek authors generally told of the Rhetorician Corax (crow) and his pupil Tisias. The puzzled judges, in lieu of a decision in the case, angrily pronounced of plaintiff and defendent—Κακου κοϱακος κακον ωον (plaguy egg of a plaguy crow!) Hence the proverb.—*Sir W. Hamilton Reid's Works*, p. 704.

The dilemma of Bias, viz.—Si uxorem ducas formosam, habebis communem, se deformem, pænam: ergo Nulla est ducenda—like many other examples, may be shown to be false, from not enumerating all the possible suppositions; for as Aldrich observes, '*est quædam media pulchritudo*,—(there is a certain intermediate degree of beauty,) or it may be shown to be retortible; thus:—

Si formosam duxero, non habebo pænam: si deformem, non habebo communem.

[b] The usual view of the enthymeme, though of a remote date, is not Aristotelic. The Stagirite, as mentioned in the text, distinguishes the enthymeme from the pure syllogism by considering it as a reasoning of a peculiar *matter*, a reasoning proceeding on *signs* or *likelihoods*, συλλογισμος (ατελης) εξ εικοτων η σημειων. The term ατελης (imperfect), usually introduced into this definition, and on which the common view of the enthymeme mainly rests, has been ejected as spurious, on the most satisfactory authority. The supposition, also, that the word ενθυμημα, from being compounded of εν and θυμος, which, in an etymological point of view, is certainly correct, has tended much to confirm the general misapprehension. In the language of Aristotle, θυμος is not *the mind*; neither does he use the word ενθυμημα as having anything to do either with expressed or suppressed premisses. Other writers also used

or, as it is often termed, an *imperfect* or *defective* syllogism. In Aristotle's writings, it never means this. The term *imperfect* is not applied by him to an argument with a suppressed premiss, but to a syllogism drawn in the second or third figure, the truth of which is not directly evident by the *dictum de omni et de nullo*.

An enthymeme, in its proper signification, may be as complete in its expression as any other kind of syllogism; for it merely differs from the syllogism in this, that its conclusion depends on *signs* and *likelihoods*.[a] Its province is mainly probable reasoning, and therefore treats reasoning as applied to a particular kind of *matter*. It does not proceed upon axioms, like the syllogism. The matter of the major premiss of an enthymeme is taken from the τοποι (topics or common places), and these hold the same place in regard to the enthymeme, which the axioms do to the syllogism. The τοποι, or common places, are general principles, based on

the word, but without any technical significance. The following passages from Sophocles may suffice in proof of this:—

ταρβειν μεν ω γεραιε τανθυμηματα πολλη σ' αναγκη τα'πο σου. —*Œd. Col.* 292. (Much and forcible reason is there to be awed by the *sentiments* uttered by thee, old man.)

εχεις γαρ ουχι βαια τανθυμηματα των σων αδερκτων ομματων τητωμενος.—*Ibid*, 1199. (For you bear no slight *impressions* of this, being deprived of your sightless eyes.)

It would appear from these passages, that the word ενθυμημα originally meant something present to the mind for *consideration* or *reflection*; and the transition from this, as Mr Mansel observes, to an *argument of probability*—a suggestion, though not demonstrative, yet deserving attention in practical questions—is easy and natural enough. On this point the learner may advantageously consult Ed. Rev., vol. lvii., p. 221; Mansel, app. p. 40, et seq.

[a] Εικοτα—Σημεια—Τεκμηριον. 'An argument which alleges some antecedent, is called by Aristotle an εικος; and that which alleges some consequent, a σημειον. If it alleges a consequent which could not have been produced by any other cause but the supposed one, the argument is a τεκμηριον, or positive proof. For instance, if it is to be proved that A murdered B, any former grudge of A's against B would be an εικος, or predisposing cause which might have produced the act; and any sudden enrichment of B just about the time of the murder, would be a σημειον, or probable effect of the action.'—*Moberly*, p. 166.

probabilities, not on axioms; and the term τοπος, in this application, may be explained by naming it the *place* where middle terms are found.[a] But since enthymemes derive their force only from cumulation, there is nothing gained from reducing them to syllogistic form.

The foregoing is a brief statement of the nature of the Aristotelian enthymeme, and is merely given to guard the learner against a prevalent, though erroneous notion. The common view, however, whether the result of misapprehension or of intentional innovation, has been too long countenanced by almost all writers on logic to be readily rejected. It is a question, indeed, how far the rejection of the common view is desirable, if we consider how much it conduces to logical expertness. In ordinary argumentation, syllogisms invariably occur in an abbreviated form, for the entire statement of premisses and conclusion would appear pedantic and artificial; and in connection with the word enthymeme, in its ordinary acceptation, it may not be out of place to lay before the learner the rules by which he may ascertain the particular figure in which any enthymeme may be drawn.[b]

An enthymeme, as commonly defined, is an irregular syllogism in which one of the premisses is suppressed, or, as it might be, more properly defined—an argument in the form in

[a] Quum pervestigare aliquod volumus *locos* nosse debemus: sic enim appellatæ sunt hæ quasi sedes e quibus argumenta promuntur. Itaque licet definire *locum* esse argumenti sedem; argumentum autem, rationem, quæ rei dubiæ faciat fidem; Cic. Top. cap. 2.—(When we wish to trace out any argument, we ought to know the places, for, on this account, they have been named by Aristotle the seats, as it were, whence arguments are adduced. Therefore, we may define a *place* to be the seat of an argument, but an argument the reason or cause which confirms something doubtful.) The word argument is used here as synonymous with the *middle term*.

[b] In the formal view of logic, the enthymeme cannot be considered as syllogistic, for our belief in its conclusiveness must arise from our knowledge of the object-matter, and without this knowledge we could not supply the suppressed premiss either actually or mentally.

which it would naturally occur in thought or speech. It consequently consists of only the expressed premiss and the conclusion. These are designated the antecedent and consequent, the latter being the conclusion of the syllogism, and the former either the major or minor premiss.

Although the enthymeme, as ordinarily understood, is a defective syllogism, consisting of only one premiss and the conclusion, it always *implies* a syllogism, and *expresses* its terms.

If the syllogism implied in an enthymeme be a simple one, it will be easy to discover which of the premisses has been suppressed, by observing which of the extremes occurs in it; because one or other of the extremes must occur in each premiss, and from this we ascertain which of the premisses the antecedent is, and how the syllogism is to be completed.

One of the terms (viz. one of the extremes of the question) always occurs twice, and when this term is the subject of the consequent, the major premiss is suppressed; but if the term twice occurring be the predicate of the consequent, the minor premiss is suppressed. The suppressed premiss is supplied by comparing with the middle term the extreme which occurs only once.[a]

In the greater number of enthymemes the minor is expressed as being more particularly related to the question to be proved, and also as being more likely to be called in question than the major. The major, as already stated, is usually

[a] Although the major premiss is generally suppressed in most enthymemes, yet there are some enthymemes in which the minor premiss is found to be omitted. This may happen when the minor premiss is very evident, or when much stress is meant to be laid upon the major, *e. g.*—'Every tyrannical king deserves to be deposed by his subjects; therefore, Nero deserved to be deposed by the Romans.' The minor premiss which is suppressed may be thus supplied—

'Nero was a tyrannical king;'

and thus the argument is reduced to regular syllogistic form.—*Huyshe*, p. 129.

of a more general character than the minor, containing a truth better known, and consequently less liable to objection or contradiction.

In order to show in what figure an enthymeme is drawn, the following rules have been laid down; and by attending to these, in connection with the special rules of syllogisms, the figure of an enthymeme may be readily ascertained.

Rule I.

When the antecedent and consequent have a common subject, the enthymeme is drawn either in the first or second figure, and the major premiss is suppressed.

Here three things are to be noted.

1. That it is only in the first and second figures that the minor proposition and conclusion can have a common subject.

2. That if the minor is *negative*, the enthymeme is not drawn in the first figure.

3. That if the conclusion is *affirmative*, the enthymeme is not drawn in the second figure.

In the following enthymeme, viz.:—

Isaiah was a true prophet; therefore,
Isaiah was inspired,

the antecedent and consequent have a common subject, viz. 'Isaiah.' The other terms are 'prophet,' the predicate of the antecedent, and 'inspired' the predicate of the consequent; but since a syllogism can only have three terms, and as the middle term does not appear in the conclusion, the term 'prophet' must be the middle term; and by comparing it *distributed* with the major term 'inspired,' we supply the suppressed premiss, and have a syllogism in Barbara of the first figure. Thus,

All true prophets are inspired.
Isaiah was a true prophet.
Isaiah was inspired.

The following enthymeme, viz.:—

'No guilty pleasures are unattended with remorse, therefore no guilty pleasures are truly satisfactory,'

is drawn in the second figure. The consequent and the antecedent have a common subject, viz. 'No guilty pleasures;' the other terms being 'truly satisfactory,' and 'unattended with remorse,' which latter term must be the *middle*, as it does not appear in the conclusion; and by comparing it with the major term 'truly satisfactory,' we supply the suppressed premiss, and have a complete syllogism in Camestres of the second figure. Thus,

Whatever is truly satisfactory is unattended with remorse.
No guilty pleasures are unattended with remorse.
No guilty pleasures are truly satisfactory.

Rule II.

When the antecedent and consequent have a common predicate, the enthymeme is drawn either in the first or third figure, and the minor is suppressed.

It must be noted here,—

1. That it is only in the first and third figures that the major proposition and conclusion can have a common predicate.

2. That if the conclusion is universal, the enthymeme is not drawn in the third figure.

In the following example, viz.:—

Nothing difficult of attainment is within reach of the indolent; therefore, useful knowledge is not within reach of the indolent,

the antecedent and consequent have a common predicate, viz. 'within reach of the indolent;' and, as the only other term which does not appear in the conclusion is 'nothing difficult of attainment,' this must be the middle term; and by comparing it with the subject of the conclusion, viz. 'useful knowledge,'

we supply the minor premiss, and have a complete syllogism in Celarent of the first figure. Thus,

Nothing difficult of attainment is within reach of the indolent.

All useful knowledge is difficult of attainment; therefore,

Useful knowledge is not within reach of the indolent.

The following enthymeme, viz. :—

All who believe in dreams, must be ignorant of the effects produced by external objects on the body in sleep; therefore, some ancient poets must have been ignorant of the effects produced by external objects on the body in sleep,

is in the third figure; and by comparing the subject of the consequent or minor term, viz., 'some ancient poets,' with the middle term, 'believe in dreams,' we supply the minor premiss, and have a regular syllogism in Datisi. Thus,

All who believe in dreams must be ignorant of the effects produced by external objects on the body in sleep.

Some who believed in dreams were ancient poets.

Some ancient poets must have been ignorant of the effects produced by external objects on the body in sleep.

Rule III.

When the subject of the antecedent is the predicate of the consequent, the enthymeme is drawn either in the second or fourth figure, and the minor is suppressed.

It must be observed here,—

That it is only in the second and fourth figures that the subject of the major proposition can be the predicate of the conclusion.

An enthymeme is frequently an abbreviation of a conditional or disjunctive syllogism, and in either of these cases it presents *four* different terms, neither of which occurs twice. But as the consequent, in such circumstances, depends alto-

gether on the suppressed premiss, that premiss must be either a conditional or disjunctive major proposition, *e. g.*— 'The objects in nature are not self-existent. Therefore, they were created by a self-existent being.' This example, on examination, will prove to be a conditional syllogism in an abbreviated form, and may be expanded thus,—

If the objects in nature are not self-existent, they were created by a self-existent being.

But the objects in nature are not self-existent; therefore,

They were created by a self-existent being.

SECTION VII.

OF THE EPICHEIREMA.

An Epicheirema[a] is a syllogism, with a prosyllogism appended either to the major or minor premiss, or to both. The prosyllogism is incidentally introduced, with the view of proving one or other of the premisses of the argument laid down. It forms the expressed premiss of an enthymeme, of which the premiss to which it is appended is the conclusion, e. g.—

All sin is dangerous.

Covetousness is sin, (for it is a transgression of the law;) therefore,

Covetousness is dangerous.

The minor premiss, viz.—

Covetousness is a transgression of the law; therefore, it is sin— is an enthymeme.

The following example of an epicheirema is a syllogistic condensation of Mr Payne's refutation of Dr Brown's theory on the nafure of virtue. In answer to the questions, What

[a] A syllogism with such a premiss is so called from επιχειρεω, I undertake to prove.

is virtue? How do our feelings of moral approbation arise? Dr Brown states that virtue is a relation, and that relations do not exist in the objects, but in the mind that contemplates them—that there is no virtue in actions—nothing that is in one action which does not exist in another, to excite the emotion of moral approbation—that virtue is a felt relation to certain emotions, and nothing more—that the mind might have been formed capable of approving what it now disapproves; and in this case vice would not only seem virtue, but would really be virtue, as both depend on the arbitrary constitution of the mind.

Mr Payne's refutation may be epicheirematically stated thus—

Whatever theory maintains that virtue has no character of itself, but depends on the arbitrary constitution of the mind, must be false; (for it supplies us with no adequate cause for the rise of the emotion of approbation; for it proceeds on a practical forgetfulness of the distinction which exists between what *is* and what *ought* to be; for it implies that the most flagitious actions may, upon a change of opinion, not only lose all their turpitude, but become positively virtuous; for it implies that we do not approve of an action, because it is right, but that the action becomes right, because we approve of it.)

But Dr Brown's theory maintains that virtue has no character of itself, but depends on the arbitrary constitution of the mind; therefore,

Dr Brown's theory must be false.

The prosyllogistic proofs may be stated in separate syllogisms; thus—

Every theory on virtue that supplies us with no adequate cause for the rise of the emotion of moral approbation must be false.

Every theory on virtue maintaining that it has no character of itself, but depends on the arbitrary constitution

of the mind, supplies us with no adequate cause for the rise of the motion of moral approbation ; therefore,

Every theory on virtue maintaining that it has no character itself, but depends on the arbitrary constitution of the mind, must be false.

The learner may easily throw the remaining prosyllogistic proofs into syllogisms.

The following examples may be subjoined for exercise.

One of the best and most frequently quoted examples, is Cicero's defence of Milo. It is as follows :—

He who attempts to assassinate another, may be justly killed by the object of his murderous intentions ; (for the laws of nature, and of nations, and the conduct of good men, prove it lawful.)

But Clodius attempted to assassinate another ; (for he formed an ambuscade against him, and provided himself with armed soldiers ;) therefore,

Clodius was justly killed, by the object of his murderous intentions.

Studies which regulate the conduct of the mind are of the utmost importance ; (for it is the mind which directs all our actions.)

Logic is a study which regulates the conduct of the mind ; (for it is wholly employed about its operations ;) therefore,

Logic is a study of the utmost importance.

This form of reasoning is often employed efficaciously; but every superfluous proof should be omitted. In many examples, the proof of the minor is of little use; yet, whenever the auxiliary propositions are employed to strengthen either the agreement or repugnancy of the extremes in the conclusion, they are used with effect.

SECTION VIII.

OF THE SORITES.

The sorites[a] is so named from σωρος, a heap. It consists of a series of propositions so arranged, that the predicate of each becomes the subject of the next, till at length, in the ultimate conclusion, the predicate of the last proposition is affirmed or denied, as the case may be, of the first subject in the series. In a sorites there are as many middle terms as there are intermediate propositions between the first and last, the subject of each intermediate proposition being a middle term. A sorites may, therefore, be drawn out into as many separate syllogisms as there are intermediate propositions, since each intermediate proposition contains a middle term.[b]

In this kind of syllogism the mind proceeds from link to link in the chain of reasoning, without drawing separate conclusions, as for instance,

A is B,
B is C,
C is D,
D is E,
Therefore A is E,

but for these abstract symbols let us substitute an example.

[a] The term sorites implies that the propositions are *piled*, as it were, one on another. The German term (kettenschluss), meaning chain-argument, is more appropriate, as it denotes the mind's progress in linking one judgment to another in a process of argumentation.

[b] A sorites has as many middle terms as there are propositions, *less by two*, for there are exactly as many different terms as propositions, but two of these terms are extremes. It hence also appears that if a sorites be resolved into syllogisms, those syllogisms will be two less than the propositions of the sorites, since there will be as many syllogisms as there are middle terms. However, the number of syllogisms may be better determined thus ; if but one proposition of the sorites were employed in each syllogism, there would be as many syllogisms as propositions ; but in the first and last syllogism there are, respectively, two propositions of the sorites used, and for each of the intervening syllogisms but one proposition.— *Walker.*

All who truly love wisdom earnestly desire it;

All who earnestly desire wisdom use the means of attaining it;

All who use the means of attaining it encounter difficulties;

All encountering difficulties are patient, persevering, and self-denied;

All who are patient, persevering, and self-denied, are virtuous;

Therefore, all who truly love wisdom are virtuous.

The separate syllogisms into which a sorites may be expanded may be all of the first figure, and as the design of forming them is to bring the minor extreme, or first term, into connection with all the other terms, the following arrangement is followed. The first syllogism in the series has for its major premiss the second proposition in the sorites, and for its minor premiss the first proposition; while the conclusion connects the minor extreme with the second middle term, thus—

All who earnestly desire wisdom use the means of attaining it;

All who truly love wisdom earnestly desire it;

All who truly love wisdom use the means of attaining it.

In the second syllogism, the major premiss is the third proposition in the sorites, and the minor the conclusion of the first syllogism, thus—

All who use the means of attaining wisdom encounter difficulties;

All who truly love wisdom use the means of attaining it.

All who truly love wisdom encounter difficulties.

The same order is followed in the remaining syllogisms—the succeeding proposition becoming the major, and the conclusion of the preceding syllogism the minor of each. The series ends when the first term in the sorites, or the minor

extreme, is connected, or compared with the last predicate, or major extreme, as follows :—

All who encounter difficulties are patient, persevering, and self-denied.

All who truly love wisdom encounter difficulties.

All who truly love wisdom are patient, persevering, and self-denied.

All who are patient, persevering, and self-denied, are virtuous.

All who truly love wisdom are patient, persevering, and self-denied.

All who truly love wisdom are virtuous.

The true force of the argument in a sorites is to be deduced, not from the resolution of it into syllogisms, but from the consideration that something is universally affirmed or denied in the last premiss of a term, in which the preceding premisses show that the first subject is contained; and therefore, in the conclusion, the same is legitimately affirmed or denied of the first subject, in the same quantity which it has in the first premiss.

It has been stated above, that in expanding a sorites into separate syllogisms, the first in the series has for its major premiss the second proposition in the sorites, and the first proposition for its minor. This transposition is required, in order that the separate syllogisms may be in the first figure, and consequently brought under the dictum which applies to that figure. Thus all the syllogisms will be in the first figure, and all except the last will be in the moods AAA or AAI, in the latter, if the first premiss of the sorites be particular. On examining the two first propositions in the foregoing sorites, it will be seen that the middle term is the predicate of the major and the subject of the minor; hence were a conclusion to be drawn without a transposition of the premisses, the syllogism would be in Bramantip of the fourth figure; thus—

All who truly love wisdom earnestly desire it.
All who earnestly desire wisdom use the means of attaining it.
Some who use the means of attaining it truly love wisdom.

It has also been stated, that in the second syllogism of an expanded sorites, the major premiss is the third proposition in the series, and the minor the conclusion of the first separate syllogism. And it may be mentioned, in explanation of this, that as the two first propositions in the sorites have been made use of in the first separate syllogism, in drawing the second syllogism, the third proposition in the sorites, used as a major premiss, with the conclusion of the first separate syllogism used as a minor, will give a conclusion in Barbara of the first figure. The process consequently to be followed, in expanding a sorites into separate syllogisms, is to begin with transposing the two first propositions in the soritical series, in order to give the middle term its proper place in the premisses of a syllogism drawn in the first figure; and, in the second, to use the third proposition in the sorites as a major, with the conclusion of the first separate syllogism as a minor. This latter process is equally necessary as the first, in order to bring all the separate syllogisms under the principles which regulate the first figure.

With reference to a categorical sorites, such as given above, it may be remarked—

1. That no proposition of a sorites except the last can be negative.

2. That no proposition of a sorites can be particular except the first. And

3. That if the first proposition be particular, the conclusion must be particular.

In explanation of the first of these rules, viz., that no proposition except the last can be negative, it may be stated that when a sorites is expanded into separate syllogisms, the last syllogism can alone admit of a negative premiss and con-

clusion ; for since the middle term is the subject of the major proposition, the syllogism must be either of the first or third figure, and, consequently, by the special rules applicable to these figures, the minor must be affirmative. But the minor of each successive syllogism is the conclusion of that preceding, and, by being affirmative, proves that the premisses from which it was deduced were also affirmative. The last premiss of the sorites, therefore, viz., the last intermediate proposition, is the only one that can be negative, because the last premiss alone never gives occasion to employ the conclusion of the last expanded syllogism as the minor of a subsequent one ; for should any other premiss of the sorites but the last be negative, it would lead to a negative conclusion, and that conclusion being made the minor of the following syllogism, would violate the special rules of the first, which does not admit of a negative minor premiss.

In explanation of the second of the foregoing rules, viz., that no proposition of a sorites can be particular except the first, it may be stated that since in expanding a sorites into separate syllogisms of the first figure, it is necessary to transpose the two first premisses, for this transposition gives a major with a universal subject ; and in all syllogisms of the first figure the major must be universal ; for if this were not the case, the middle term would be taken twice particularly. Hence all the intermediate premisses of a sorites must serve as premisses to universal conclusions.

In explanation of the third rule, viz., that if the first proposition be particular, the conclusion must be particular, it may be stated, that since the subject of the first proposition in a sorites is also the subject of the conclusion, and since no term can be used more universally in the conclusion than in the premisses, the subject of the conclusion must be particular, and consequently the conclusion itself. These conditions apply of course only to the categorical sorites.

A sorites may also be drawn in the conditional or hypo-

thetical form. In the *constructive* conditional sorites, the process is from the position of the first antecedent to the position of the last consequent.

Example 1.

If it is the duty of a parent to take care of his children, he should keep them as much as possible from vice.

If he should keep them from vice, he ought to teach them what is virtuous.

If he ought to teach them what is virtuous, he is bound to instruct them in religious knowledge.

But it is the duty of a parent to take care of his children; therefore,

He is bound to instruct them in religious knowledge.

Example 2.

If the scriptures are the word of God, it is important that they should be well explained.

If it be important that they should be well explained, they deserve to be diligently studied.

If they deserve to be diligently studied, an order of men should be set apart for that purpose.

But the scriptures are the word of God; therefore,

An order of men should be set apart for diligently studying them.

In the *destructive* sorites, on the other hand, we proceed from the remotion of the last consequent to the remotion of the first antecedent.

Example 1.

If Romish councils speak truth, Popery should be credited.

If Popery should be credited, Protestantism is fallacious.

If Protestantism be fallacious, the scriptures are not the rule of faith.

But the scriptures are the rule of faith; therefore,

Romish councils do not speak the truth.

Example 2.

If the soul is material, it must have extension.
If it has extension, it must have parts.
If it has parts, it must be dissoluble.
But the soul is not dissoluble; therefore,
The soul is not material.

If the propositions in a soritical series be metaphysically true, and the connection between them strictly just, this sort of reasoning will be legitimate; but it is frequently very sophistical, as will appear from the following humorous sorites, said to be used by Themistocles, to prove that his son governed the world:—

My son governs his mother.
His mother governs me.
I govern Athens.
Athens governs Greece.
Greece governs the world; therefore,
My son governs the world.

The sorites invented by Goclenius, and hence called the Goclenian sorites, differs from the common form in two respects—1. Its premisses are reversed; and, 2. It begins with the premiss containing the two terms which have the greatest extension, while the common form starts with the premiss containing the terms which have the greatest intension or comprehension.

The Goclenian sorites may be represented by the following symbols:—

D is E.
C is D.
B is C.
A is B.
A is E.

(Note.)

Aristotle does not notice the sorites as a distinct species of argumentation, but its principle may be gathered from his writings.—See Categ. 3, 1, and Anal. Pr. 1, 25, 2, 11. Its detailed exposition, as a distinct form of reasoning, should properly be attributed to the Stoics.

The sorites was a favourite mode of argument with Cicero, although in many instances with questionable conclusiveness. The following are selected as examples:—

Example 1.

Quoniamque duos beatissimos esse constat, beatus autem esse sine virtute memo potest, nec virtus sine ratione constare, nec ratio usquam inesse, nisi in hominis figura; hominis esse specie deos confitendum est.—De Nat. Deor. 1, sect. 18.

Example 2.

Necesse est, qui fortis sit, eundem esse magni animi; qui magni animi sit, invictum; qui invictus sit, eum res humanas despicere atque infra se positas arbitrari; despicere autem memo potest eas res propter quas ægritudine affici potesc. Ex quo efficitur fortem virum ægritudine nunquam affici.—Tus. Dis. lib. iii. sec. 18.

SECTION IX.

OF THE EXAMPLE.

In the species of argument called *example*,[a] we draw a conclusion from a single fact or occurrence—in other words,

[a] The example conceals a defective syllogism, and yet there is no argument so commonly employed. 'The French Revolution of 1792 will end in an absolute monarchy, because the English Revolution of 1640 did so.' Such reasoning is only valid, provided we can conclude, from the fate of the English Revolution, that *all* revolutions lead to absolute monarchy—a judgment which may be true in itself, but cannot be formally concluded from the given premiss. We require other comparisons and arguments, to show that the tendency to absolute monarchy is an inseparable mark of revolution, and not a mere accident belonging to the English Revolution only. And yet examples are so suggestive, that they often appear almost to amount to demonstration; and it would be absurd to endeavour to expel them from rhetoric, or from science, on the ground that they are not formally complete.—*Outline of the Laws of Thought*, p. 335.

The example differs from induction in two respects—First, Induction proves the universal from a complete enumeration of the individuals; example selects single cases. Second, Induction stops at the universal; example infers syllogistically a conclusion regarding another individual.—*Mansel*, p. 82.

we infer from a fact that has occurred, that a similar result will take place in respect to some other unknown fact or occurrence.

Example has some relation to *induction*, but it differs from it in two respects—1. In induction the enumeration must consist of many singular facts, while example requires no more than one. 2. In induction the conclusion is *universal*, but in example *singular*.

In induction the nature of the process is such, that when we draw a conclusion we infer that in similar circumstances the same result will always follow. In example this is not the case, for the conclusion does not infer the certainty of any fact occurring in the same manner as the individual fact or facts from which we draw our conclusion, but merely the *probability* of such a result or occurrence.

Examples.

1. The civil war between Marius and Sylla rent the republic; therefore, the war between Pompey and Cæsar will rend it.

2. Artabanus employs this argument to dissuade Xerxes from his intended invasion of Greece :—

'It was I that advised your father, and my brother Darius, not to carry arms against the Scythians—men who have no cities in any part of their territory; but he, cherishing the hope of subduing those pastors, heeded not my counsel. He proceeded on the expedition, and returned, after losing many men of his army. But you, my liege, are about to carry war against men far more brave than the Scythians—men who are reported to be most valiant both by sea and land. It is right I should inform you of the danger that we are to apprehend in so doing.'—*Herod. Book*, 7-10.

3. I, O king, who have already beheld numerous and mighty powers overthrown by smaller, would not fain permit you in all things to give way to youth—knowing what an

evil thing it is to covet much—recollecting, likewise, what was the unfortunate result of Cyrus' expedition against the Massagetæ—calling likewise to mind that of Cambyses against the Ethiopians, and having myself with Darius fought the campaign against the Scythians,—aware of all these things, I held the opinion, that if you did not stir, you would be held the happiest of mortals.—*Herod. Book*, 7-18.

SECTION X.

OF SOPHISMS.

Sophisms are of two kinds—*verbal* and *material*. In the former, the fallacy is in the *diction;* in the latter, the fallacy lurks in the *object-matter*. In the language of the schools, these were termed fallacies *in dictione* and *extra dictionem*, corresponding with the Aristotelic division, viz., *οἱ παρὰ τὴν λέξιν*, and *οἱ ἔξω τῆς λέξεως*.

Fallacies in the *expression* are necessarily and essentially connected with language. Fallacies in the *matter*, on the other hand, are related to language only in a secondary or accidental sense.[a]

Fallacies have been defined to be 'deceptive or apparent arguments, by which a man is himself convinced, or endeavours to convince others of something which is not really proved.'

Aristotle enumerates thirteen different kinds of fallacies. Of these six are said to be *in dictione*, or in the expression, and seven *extra dictionem*, or in the matter. This enumeration is not given as exhaustive of all the possible species of fallacies, but rather as a catalogue of the forms under which fallacies most generally present themselves in dialectics or probable reasoning.

[a] The former arise from defects in the arbitrary signs of thought; and hence are frequently confined to a single language. The latter are in the thought itself, whether materially in the false application of notions to things, or formally in the violation of the laws by which the operations of the reason should be governed. Under this head are thus included both false judgments and illogical reasonings.—*Mansel.*

I.

FALLACIES IN DICTIONE, OR IN THE EXPRESSION.

The fallacies in the expression are the following:—

1. Homonymia, or quibble.
2. Amphibolia, or ambiguity.
3. The fallacy of composition.
4. The fallacy of division.
5. The fallacy of accent or prosody.
6. The fallacy of figure of speech.

1. A sophism of HOMONYMIA, or *æquivocatio*, is when any term in the syllogism can be used equivocally, or in a double sense, and thus constitute in reality two terms, thereby introducing four terms into the syllogism.

This species of fallacy is too obvious to be employed in a process of reasoning. No one can be deceived by it. The following may suffice as examples:—

1.

All that believe shall be saved.
The devils believe; therefore,
The devils shall be saved.

2.

The dog is an animal.
Sirius is the dog; therefore,
Sirius is an animal.

3.

The turtle sings.
The turtle is a fish; therefore,
A fish sings.

It may not be out of place here to enumerate some of the circumstances under which words may have double meanings. 1. By *accident*, as *light* meaning the contrary to *heavy* and also to *dark*. 2. From *analogy*, as *line* in the military or naval art, signifying a form of drawing up troops or ships; in geography, a certain division of the earth; in mathematics, the shortest distance between two points; in fishing, a string

to catch fish; in morals, a rule of conduct; or, more generally, as we term that a *sweet* taste which gratifies the palate, or a *sweet* sound which gratifies the ear; so in like manner the *leg* of a table, the *leg* of an animal; the *foot* of a mountain, the *foot* of a man. 3. From *resemblance,* as a *blade* of grass from its resemblance to the blade of a sword; *dove-tail* in joinery, from its similarity to the tail of a dove. 4. From *metaphor*, as a ship *ploughing* the deep.

2. Amphibolia. In this species of fallacy the ambiguity does not arise so much from the double meaning of a word as from the various constructions of which a sentence is capable. The ancient languages, and more particularly the Greek and Latin, are liable to a variety of construction, from the inflexions of the words, and the inverted nature of the sentences. Thus, in the well-known example given by Wallis—

Aio te Æacida, Romanum vincere posse, (I say, the Roman you shall kill)—

it does not appear, from the form of the expression, whether Æacides was to slay the Roman, or the Roman Æacides.

3. Fallacy of Composition. This fallacy occurs when the middle term is used *distributively* in the major premiss, and *collectively* in the minor; for in this case we argue from a term first taken in its divided sense, and then in its collective sense, e. g.—

1.

Three and two are two numbers.
Five is three and two; therefore,
Five is two numbers.

2.

The testimony of *this* witness is insufficient to prove the fact alleged—so is the testimony of *that* witness—and so of the *other*.

We believe the fact on the testimony of this, that, and the other witness.

Therefore, we believe the fact on sufficient evidence.

3.

The gaining of a high prize is no uncommon occurrence.

What is of no uncommon occurrence may be reasonably expected.

The gaining of a high prize may be reasonably expected.

4. Fallacy of Division. This fallacy is the converse of that of composition. It occurs when the middle term is used *collectively* in the major premiss, and *distributively* in the minor—there being no legitimate inference from a term used in a collective sense in one premiss, and in a distributive sense in another, e. g.—

1.

The primary planets are seven.

Mercury and Venus are primary planets; therefore,

Mercury and Venus are seven.

2.

All the apples from that tree are worth twenty shillings.

This is an apple from that tree; therefore,

It is worth twenty shillings.

3.

All the angles of a triangle are equal to two right angles.

A B C is an angle of a triangle; therefore,

A B C is equal to two right angles.

4.

All the trees make a thick shade.

This is a tree; therefore,

It makes a deep shade.

5. Fallacy of Accent or Prosody. A fallacy of accent or prosody is when the same thing is predicated of different terms, if they be only written or pronounced in the same way, e. g —

Equus est quadrupes.

Aristides est Æquus.

Aristides est quadrupes.

The play of words here is upon 'equus' and 'æquus,' and

is nothing but a sorry pun, as all examples of this fallacy must necessarily be.

6. FALLACY OF THE FIGURE OF SPEECH. This fallacy arises from words nearly related to one another, by etymology or the grammatical structure of language. Many words springing from the same root may have such a similarity of sound, although varying in signification, as to make them appear to be identical in meaning. Such are *murder, murderer; project, projector; presume, presumption; art, artful; design, designing; faith, faithful; theory, theorist*, &c. The following are examples:—

Murder should be punished with death
This man is a murderer.
This man should be punished with death.

However just in this case the conclusion may be, the syllogism cannot properly be called an argument, for the term 'murder' is certainly not a proper middle term, to contain the minor term 'murderer.'

Projectors are unfit to be trusted.
This man has formed a project.
This man is unfit to be trusted.

This argument is also invalid, for the bad sense usually attached to the word 'projector' is not implied in the term 'project.'

Theorists are unsafe guides.
This man has formed a theory; therefore,
He is an unsafe guide.

The fallacy in this example lies in inferring, that a person who frames a *theory* must be a *theorist*. The two terms, though derived from the same root, cannot be considered as equivalent expressions, for the meaning commonly attached to the latter term is not implied in the former. To frame a *theory* is considered a proof of intellectual skill; but to be a *theorist*, in the common acceptation of the term, implies a proneness to unsound speculation.

II.

FALLACIES EXTRA DICTIONEM, OR IN THE MATTER.

Material fallacies, as the name implies, do not arise from any ambiguity in terms or forms of speech; and to this class may therefore be referred any species of fallacy not resulting from ambiguity of language. Some are of opinion that material fallacies are the only ones that should be designated strictly logical, while others (the formal school of logicians) consider them as beyond the province altogether. The fallacies in the matter are the following:—

1. Fallacia accidentis.
2. Fallacia a dicto secundum quid ad dictum simpliciter, or its converse—fallacia a dicto simpliciter ad dictum secundum quid.
3. Ignorationis elenchi.
4. A non causa ut causa.
5. Fallacia consequentis.
6. Fallacia petitionis principii.
7. Fallacia plurium interrogationum.

1. *Fallacia Accidentis.*

The *fallacia accidentis*[a] arises when one of the terms agrees or disagrees necessarily with the middle term, and the other only accidentally; and yet in the conclusion the terms are inferred to agree or disagree necessarily; in other words the middle term is used in one premiss, to signify something

[a] The *fallacia accidentis* occurs when to *one* of two connected things something is attributed which agrees only with the *other* accidentally.—*Saunderson.*

Wallis and Aldrich define it thus: 'When something *accidental* is confounded with that which is *essential* or principally intended.'

'The example of this fallacy given by Aristotle is, Coriscus is different from Socrates. Socrates is a man; therefore, Coriscus is different from a man. The fallacy lies in assuming, that whatever is different from a given subject is incompatible with all the predicates of that subject. The reasoning is thus illogical:—Socrates is a man; Coriscus is not Socrates; therefore, Coriscus is not a man.'—*Mansel.*

simply, and as to its essence, while in the other certain accidents are taken into account along with it.

The following is one of the instances commonly quoted :[a]—

What is bought in the market is eaten.
Raw meat is bought in the market; therefore,
Raw meat is eaten.

In the major premiss the middle term, 'bought in the market,' must be understood simply as to its substance, while in the minor it is used as connected with circumstances and accidents. Hence there are four terms. In the following example there are also four terms :—

We are forbidden to kill.
Using capital punishment is killing.
We are forbidden to use capital punishment.

In this example it is plain that the middle term, 'kill,' in the major proposition, must be understood as referring to the divine command, prohibiting violence against human life, and that the violence is consequently of a *private* nature. In the minor, on the other hand, the middle must be understood in a *public* or *judicial* sense, and that circumstances are attached to it which make it a middle term, altogether different from that used in the major; yet, in the conclusion, the inference is falsely drawn from the one to the other.

The fallacia accidentis may be refuted either by distinguishing the different senses in which the middle is taken, so as to show that there are four terms in the syllogism, or by showing that the conclusion is universal, while the minor is particular, e. g.—

Whatever destroys men ought to be prohibited.
Wine destroys men; therefore,
Wine ought to be prohibited.

[a] Quod emisti comedisti, Crudum emisti; Ergo Crudum comedisti: in quo *quod* emisti et *qual* emisti confunduntur; unde quatuor termini.—*Wallis.*

In this example it is obvious that an accidental circumstance is confounded with an essential one. The major proposition must mean 'Whatever *necessarily* destroys men;' otherwise it is not true. The minor must mean, 'Wine *accidentally* destroys men;' and hence there are four terms.

2. *Fallacia a dicto secundum quid ad dictum simpliciter.*

This fallacy occurs when a term is used in one premiss in a *limited* and in the other in an *unlimited* sense, or, in other words, when we reason from a statement made under a certain restriction or limitation to the same statement made without restriction or limitation.[a]

It is sometimes difficult to distinguish this fallacy from the *fallacia accidentis;* and for this reason they have by some been regarded as one and the same. In reality, the only difference between them is, that in the *fallacia accidentis* the fallacy lurks invariably in the major, while in the fallacy under consideration and its converse, it may occur in either the major or minor.

3. *Fallacia Ignorationis Elenchi.*

By this form of fallacy is meant the fallacy of a false contradictory, and we are to understand by it any conclusion which seems to be the contradictory of some other conclusion, while in fact it is not. *Elenchus* properly signifies a conclusion contradictory of an opponent's position, which in every disputation is the thing of course to be established. This fallacy occurs whenever a disputant either intentionally or through ignorance overlooks some one or other of the conditions necessary for proving the contradictory of any proposi-

[a] 'This fallacy arises when that which is true only restrictedly (*secundum quid*) is taken as *simply* and absolutely true.'—*Saunderson.*

'When what is laid down in a limited and conditional sense is applied as if laid down absolutely.'—*Wallis.*

'When we proceed from a term taken in a determinate sense to the same taken absolutely.'—*Aldrich.*

tion laid down; and as four conditions are required to constitute a valid contradiction—viz., that we speak of the same thing in *the same sense*, *as to the same part*, *compared with the same thing*, and *existing at the same time*—the absence of any of these requirements will vitiate a contradictory.

Examples.

1. The point in dispute between primitive Christians and Polytheists was whether there was one God only, or many gods. Lymachus argues that their ancestors adored a plurality of gods, and were always victorious, which was quite foreign to the subject debated. Besides the nations they conquered, were also Polytheists.

2. Paschal, in arguing against Atheists, insists that Atheism is more dangerous than Theism; whereas the point in dispute is truth, and not the prudence of either system.

3. Anger has been called a short madness; and people of the weakest understandings are the most subject to it. It is remarkable, that when a disputant is in the wrong, he tries to make up in violence what he wants in argument. This arises from his pride. He will not own his error; and because he is determined not to be convicted of it, he falls into a passion.

In this example, instead of going to show *why* anger has been called a short madness, the writer shifts his ground, and wanders into reflections which have no necessary connection with the particular proposition.

4. *A Non Causa*[a] *ut Causa.*

By this is meant that fallacy which attributes an effect to a

[a] The causes sometimes assigned are *unsatisfactory*, rather than false—the error consisting not in the assignment of a *false* cause, but of one *too general* to convey any instruction, and thus deceiving the inquirer. For instance, assigning the will or permission of God, as the cause of any event, this everybody knows already; but as God always acts by the intermediation of secondary causes, it is the intermediate and not the remote cause that is sought, as this alone conveys any new knowledge.—*Kirwan*, p. 460.

false cause. It is sometimes divided into the fallacy *a non vera pro vera*, and the fallacy *a non tali pro tali*, e. g., 'A comet has appeared; therefore, there will be war. What intoxicates should be prohibited; and wine intoxicates; therefore, it should be prohibited.'

The ancients attributed the damage done by lightning to a hard substance, which they called a thunderbolt, because they were unacquainted with the nature of the electric fluid, and supposed that the small substances, such as a part of a brick or stone, which were frequently found vitrified where the electric fluid struck, really came from the clouds.

5. *Fallacia Consequentis.*

A sophism of a false consequence occurs when there is deduced from a proposition a conclusion which does not follow it. This fallacy appears most commonly in the form of an enthymeme; for one of the premisses is suppressed, that it may not be immediately evident that the rules are violated, e. g., 'Crispus is courteous; therefore, he is a flatterer.' When the suppressed premiss is supplied, the syllogism will stand either thus:—

Every flatterer is courteous.
Crispus is courteous; therefore,
Crispus is a flatterer,

and the first rule of the second figure is violated, or it must be its simple converse, viz.—

Every courteous person is a flatterer,

and then the rules of conversion are violated. It is refuted by adducing the rule which is transgressed.

6. *Fallacia Petitionis Principii,*

Or begging the question, is when that is assumed for granted

which ought to have been proved, or by reasoning in a circle, i. e., when the disputant tries to prove reciprocally the conclusion from the premisses, and the premisses from the conclusion.

OF THE PETITIO PRINCIPII.

Examples.

1. Pride is odious, because it is disliked by all; for it produces universal hatred.

2. The Jews argued that Jesus could not be the Messiah, because he did not appear as a victorious prince, as the prophecies announced he should, taking for granted that the prophecies should be understood in the literal sense, which is the point denied by Christians—not only because of the miracles of Christ, which proved him plainly to be the Messiah, but because the literal accomplishment of the prophecies could occasion no change of the depraved moral state of the world; and therefore could not be the true sense of these prophecies.

3. When necessarians say that the mind is influenced by the preponderant motive, if any motive appeared to be so before, as well as after election, their position would be just. But they infer the preponderance of the motive before election, from its appearance after the election, to have been that with which the will complied—an inference which is merely a *petitio principii*, assuming that for true which their opponents deny.

ARGUING IN A CIRCLE.

Examples.

1. Sceptics argue that we ought to doubt of everything because human reason is fallible, and may deceive us. And since reason may deceive us, we should doubt the validity of the reasons that induce us to doubt.

2. Aristotle asserts that the stars seem to twinkle, on account of their immense distance, and asserts also that they are immensely distant, because they seem to twinkle.

3. Descartes endeavoured to prove that God exists, because existence is contained in the clear and distinct idea which we have of the Supreme Being; but he afterwards derives the certainty we have, that such ideas cannot deceive us from the incompatibility of such deception with the goodness of the Divine Being.

4. The whole of Dr Brown's elaborate lectures on the nature of virtue amounts to nothing more than a vicious circle. We approve of actions, because they are right; and they are right, because we approve of them.

5. The famous arguments of the Romanists, who prove the scriptures from the authority of the church, and the church from the authority of the scriptures, is a vicious circle.[a]

6. It is certain that wealth often makes the mind uneasy, for it tends to fill it full of care; and it is equally certain that it fills it full of care, for wealthy men are seldom at ease in their minds.

[a] It may be of advantage to the learner to understand the exact grounds on which this argument is to be considered as an instance of a vicious circle. The matter is well stated by Dr Kirwan, p. 442: 'It is commonly said that Catholics form a vicious circle when they prove the authority of their church by the authority of the scriptures, and the authority of the scriptures by that of their church. But, in fact, the authenticity, and, consequently, the authority of the scriptures is proved by the testimony of Christians of all sects, that is, of all those who professed Christianity since the apostolic age unto the present day; and, undoubtedly, the Roman and Greek Catholics have their share in this *testimonial* authority, which should be carefully distinguished from *doctrinal* authority. And as the *doctrinal* is not proved by the *testimonial* authority, nor the testimonial by the doctrinal, there is no circle or reciprocation of proofs. But, if the doctrinal authority of the scriptures were attempted to be proved by the doctrinal authority of the church, and the doctrinal authority of the church by that of the scriptures, then there would be a *circle*.'

7. *Fallacia plurium interrogationum.*

This fallacy occurs when two or more questions, requiring each a separate answer, are proposed as one; so that if *one* answer be given, it must be inapplicable to *one* of the particulars asked, e. g., 'Was Pisistratus the usurper and scourge of Athens?' The answer, 'No,' would be false of the former particular, and 'Yes' would be false of the latter. This fallacy is overthrown by giving to each particular a separate reply.

OF INDUCTION.

The term induction (επαγωγη, inductio) has been variously explained. By some it has been understood to mean the *inducing* or influencing effect the nature of the reasoning implied in the inductive process has on the mind of a hearer. Others have explained it as a *bringing in*, as an inference of the question to be proved; while a third class have held it to signify a collection or accumulation of instances, to constitute an antecedent or premiss, from which to infer a required conclusion.

The last view is the correct one; for whatever diversity of opinion may prevail, regarding the exact nature of the inductive inference, in one point all must agree, that in the inductive argument the inference is from the particular to the universal—in other words, from the aggregate of individuals to the universal whole constituted by them.

But to pass from the name to the thing signified by it, three conflicting views of the proper function of induction present themselves:—

1. The *objective* process of investigating particular facts, as preparatory to illation or inference.

To this it is objected, by those who adopt the formal definition of logic, that induction, in so far as it is a logical process at all (and it is only logical, in so far as it is formal), is equally formal with syllogism, though proceeding in the in-

verse order. And it is objected, farther, that as the investigation of particular facts is purely an inventive process, it is beyond the bounds of a critical science, and cannot be admitted within the province of logic.

2. A material illation or inference of the universal from the singular, warranted either by the general analogies of nature, or by special presumptions afforded by the object-matter of any real science.

To this view the formal school also object, on the ground that the consequence is not logical, for the inference is effected *vi materiæ*, in virtue of the *matter*—that is, on grounds not implied in the notion of its antecedent.

3. A formal illation or inference of the universal from the individual, as legitimated solely by the laws of thought, and abstracted from the conditions of any particular matter.

This is the formal view, according to which any inference, strictly logical in its character, whether inductive or deductive, is determined *ratione formæ*, by reason of the *form of the argument*, which signifies that the conclusion is necessarily implied in the very conception of the premisses, for logic recognises no inference that is not necessitated by the laws of thought; and it must therefore be presumed that the induction is perfect, i. e., that the individuals mentioned are in reality the whole constituents of the species before the inductive inference can come in any way within the province of the logician.

To extend the province of logic to the selecting and testing of instances, would require a broader definition for the inductive process than for the deductive. A complete enumeration of instances, or of the members of a class, will constitute a foundation for a valid inductive inference, but the completeness is the result of a *material*, not of a *logical* inquiry. The Baconian induction, from being more scientific and scrutinising, has superseded the ancient *induction per enumerationem simplicem*, but both were merely material inquiries,

and consequently extralogical. Logic has no connection with the one or the other beyond the inference deduced from their assumed completeness.

The distinction between *deductive* and *inductive* reasoning is thus: In deductive reasoning the process is from the whole to the parts; in inductive reasoning, on the other hand, the process is from the parts to the whole.

Deductive reasoning is governed by the rule; what belongs, or does not belong to the containing whole, belongs or does not belong to each and all of the contained parts. Inductive reasoning, again, is governed by the rule; what belongs, or does not belong, to *all* the constituent parts, belongs, or does not belong to the constituted whole. These two rules are equally absolute, and determine all formal or logical inference. Whatever transcends or violates either of them, transcends or violates logic. It would not be less illegitimate to infer, by the deductive syllogism, an attribute belonging to the whole, of something it was not conceived to contain as a part, than by the inductive to conclude of the whole, what is not conceived as a predicate of all its constituent parts. Logical inference is thus only of two kinds: it must proceed either from the whole to the parts, or from the parts to the whole; and it is only under the character of a constituted or containing whole, or of a constituting or contained part, that anything can become the term of a logical argumentation.

As processes of reasoning, deduction and induction are equally essential. They are so related, indeed, that the one requires the other. Deduction is only possible through induction. The chief value of the latter consists in realising the possibility of the former. Our knowledge commences with the apprehension of singulars; and it is upon the knowledge thus acquired that every universal whole, whatever its nature may be, is founded. Deductive reasoning is consequently not an original process. In the inductive mode, logic, by synthetic illation, ascends to its wholes, and in the deductive illation re-descends from whole to parts.

But the two processes are not similar. The one is the counterpart of the other. Their analogies and differences can be best exemplified by employing the same symbols in an ascent through an inductive syllogism, and a re-descent through a deductive.

Inductive Syllogism.

X, Y, Z, are A.
X, Y, Z, are (whole) B; therefore,
B is A.

In this example, X, Y, Z, is the middle term, and being the subject of both premisses, the syllogism is apparently in the third figure; but it is only in appearance; for in the deductive process the conclusion is invariably particular in syllogisms drawn in the third figure, whereas in the example above given the conclusion is universal; but a universal conclusion is not valid in the third figure; for since the minor of a syllogism in the third figure must be affirmative, its predicate must be particular; and since this predicate must be the subject of the conclusion, the conclusion must itself be particular.

To say, therefore, on the standard of the deductive, that the inductive syllogism is in the third figure is a mistake, and the mistake arises from the ambiguity of the copula or substantive verb, which in different relations expresses either *are contained under* or *constitute.* This may be illustrated by Aristotle's example, viz.:—

Man, horse, mule, are long-lived.
Man, horse, mule, are the whole class of animals wanting bill; therefore,
The whole class of animals wanting bill are long-lived.

Here it is evident that the subject 'man, horse, mule,' stands in a very different relation to its predicate in the major and in the minor premiss, though in both cases the connection is expressed by the same copula. In the major

the copula 'are' expresses that the predicate determines the subject as a *contained* part; in the minor, that the subject determines the predicate by *constituting* it a whole; thus—

Long-lived *contains* man, horse, mule.
Man, horse, mule, *constitute* animal wanting bill; therefore,
Long-lived contains animal wanting bill.

On comparing Aristotle's example with the statement of it immediately preceding, the distinctions between it and the syllogisms drawn in the third figure are as follows:—1. That in the minor premiss of the inductive syllogism, the subject, instead of being *contained under* the predicate, in reality *constitutes* it; and, 2. That in virtue of this distinction, a universal conclusion is logically drawn in this form, which is illegitimate in the third figure of syllogism.

The above syllogism, when put in the deductive form, will stand thus—

Deductive.

B is A.
X, Y, Z, are (under) B; therefore,
X, Y, Z, are A.

In the *propositions* of both the inductive and deductive syllogisms, the order of the terms remains unchanged, but the order of the propositions themselves are reversed; for the conclusion of the inductive syllogism forms the major premiss of the deductive. Of the terms the major A is common to both; but the middle term, X, Y, Z, of the inductive syllogism, is the minor of the deductive. The minor premiss is common to both syllogisms, but its meaning, when employed in the deductive syllogism, is different from its meaning in the inductive. In the inductive, the parts, i. e., the subjects X, Y, Z, being conceived as constituting the *whole*, are the *determining* notion, while, in the deductive the same parts being conceived as *contained under* the *whole*, are the *determined* notion.

The foregoing explanation of the nature of Induction, in its logical aspect, seems sufficient for an elementary treatise. Examples and explanations might be multiplied, but the same fundamental principle applies equally to any instances that might have been adduced. The inventive process, by which general truths are arrived at, is unquestionably one of the most valuable occupations in which the human mind can be employed. And although, in accordance with the view here taken of Induction, any such investigation must have been deemed extralogical, still, did space permit, the processes by which many of the more important truths in the physical sciences have been incontrovertibly determined, would have been appended.

THE END.

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